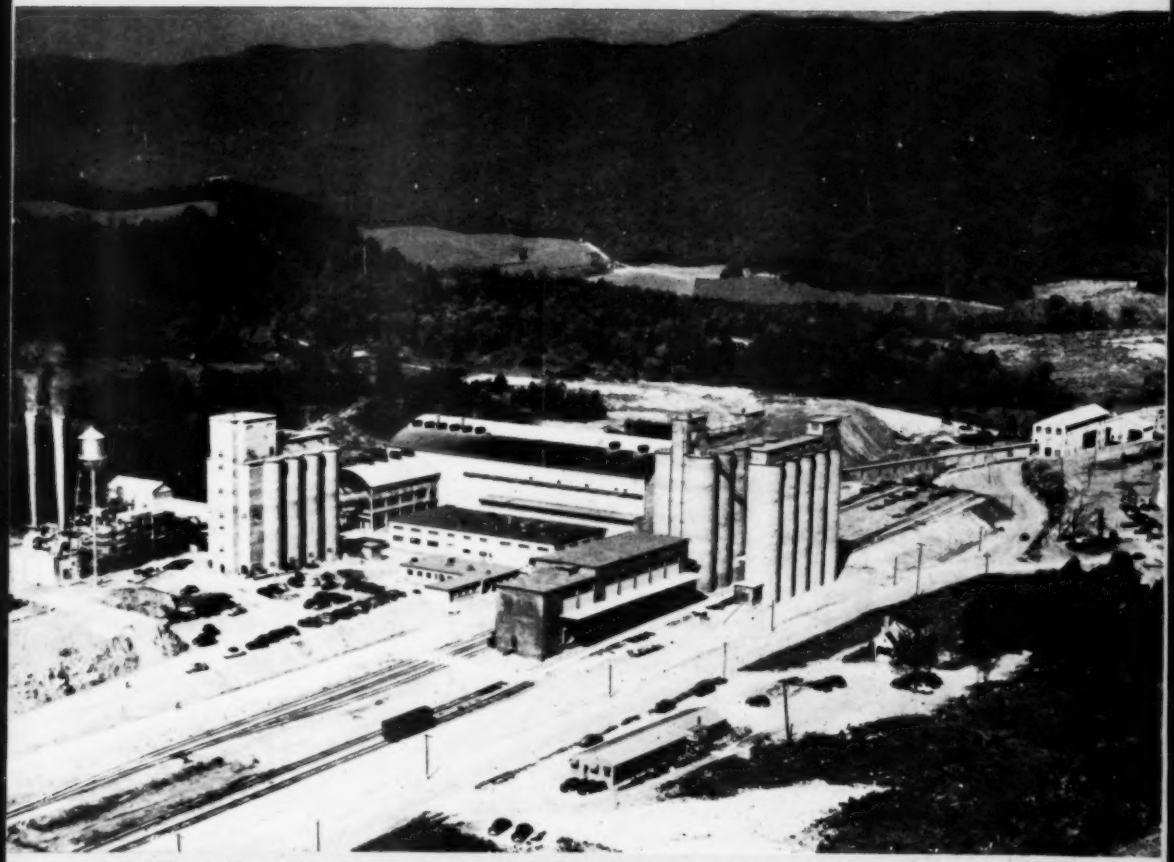
PIT AND QUARRY

JULY 1951

23rd Annual Cement Mills Number

Plants of Lone Star Cement Corp., Louisville Cement Co., Diamond P.C. Co., Lambert Freres • World Cement Review–India • Reports of Natl. Industrial Sand and Natl. Lime Assn. Conventions

Thermal Efficiency of Rotary Kiln



Aerial View of Lone Star Cement Corporation's New Plant at Lone Star, Va., Described on Page 108.

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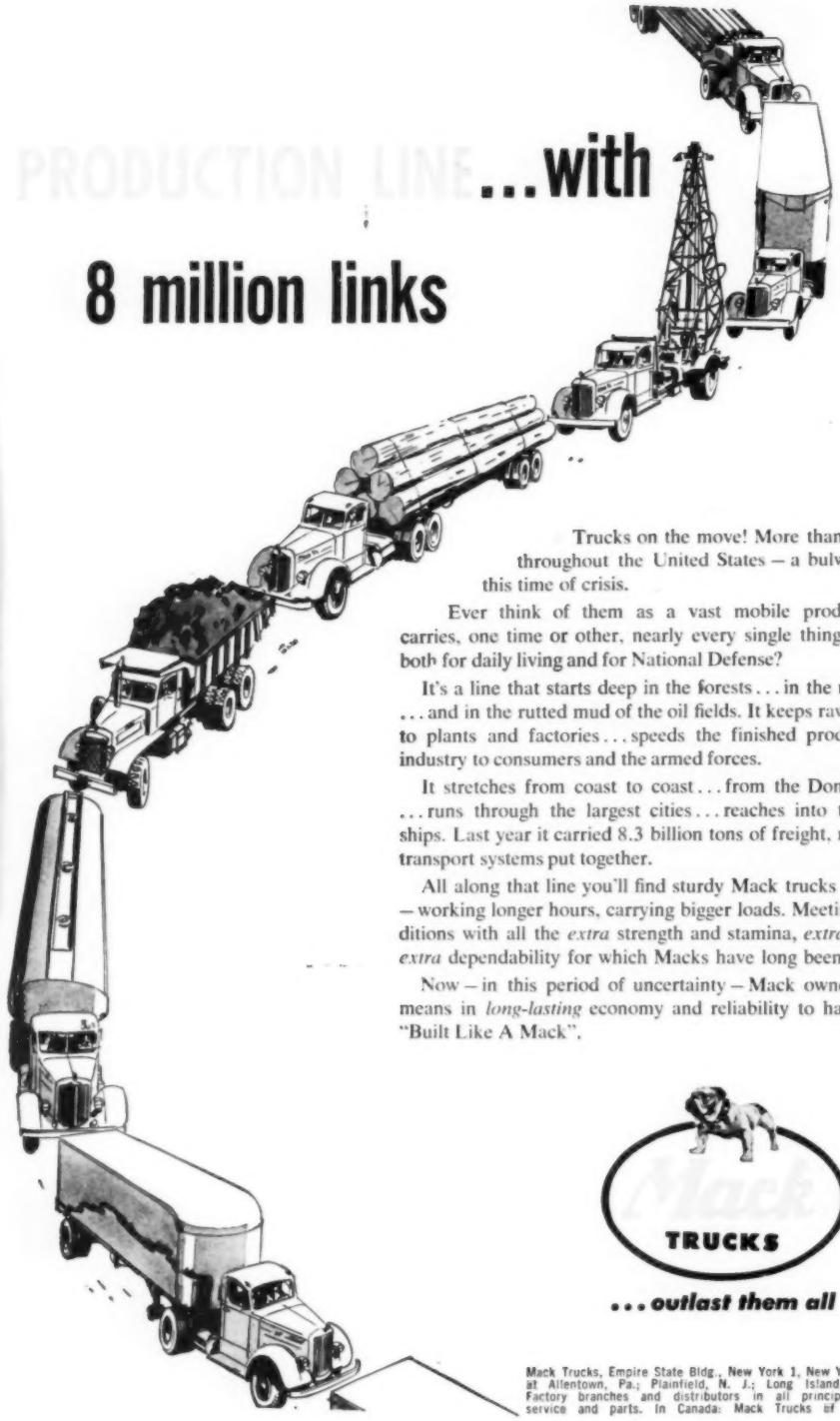
8 million links ...with PRODUCTION LINE



Trucks on the move! More than 8 million of them throughout the United States – a bulwark of security in this time of crisis.

Ever think of them as a vast mobile production line which carries, one time or other, nearly every single thing we need and use, both for daily living and for National Defense?

It's a line that starts deep in the forests . . . in the mines and quarries . . . and in the rutted mud of the oil fields. It keeps raw materials flowing to plants and factories . . . speeds the finished products of American industry to consumers and the armed forces.

It stretches from coast to coast . . . from the Dominion to the Gulf . . . runs through the largest cities . . . reaches into the smallest townships. Last year it carried 8.3 billion tons of freight, more than all other transport systems put together.

All along that line you'll find sturdy Mack trucks doing double duty – working longer hours, carrying bigger loads. Meeting emergency conditions with all the *extra* strength and stamina, *extra* performance and *extra* dependability for which Macks have long been famous.

Now – in this period of uncertainty – Mack owners realize what it means in *long-lasting* economy and reliability to have trucks that are "Built Like A Mack".

Mack TRUCKS

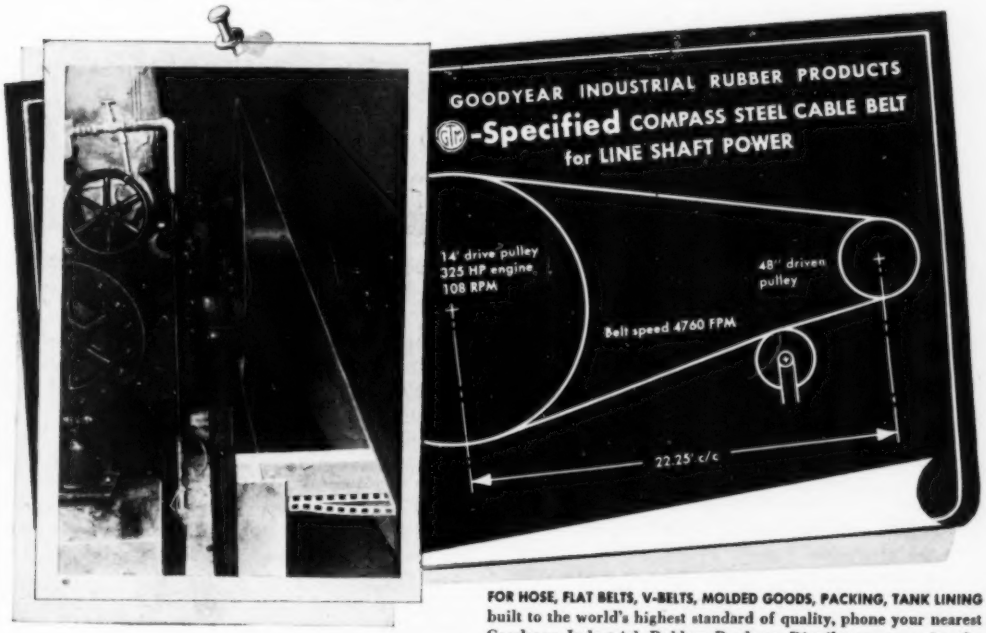
. . . outlast them all

Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

6 TIMES LONGER SERVICE

Standard flat belts on line shaft in stone plant lasted from 4 weeks to 6 months.

Goodyear's COMPASS STEEL CABLE BELT lasted *36 months plus without a single shutdown for take-up*—and was still in excellent condition when removed due to change in power source.



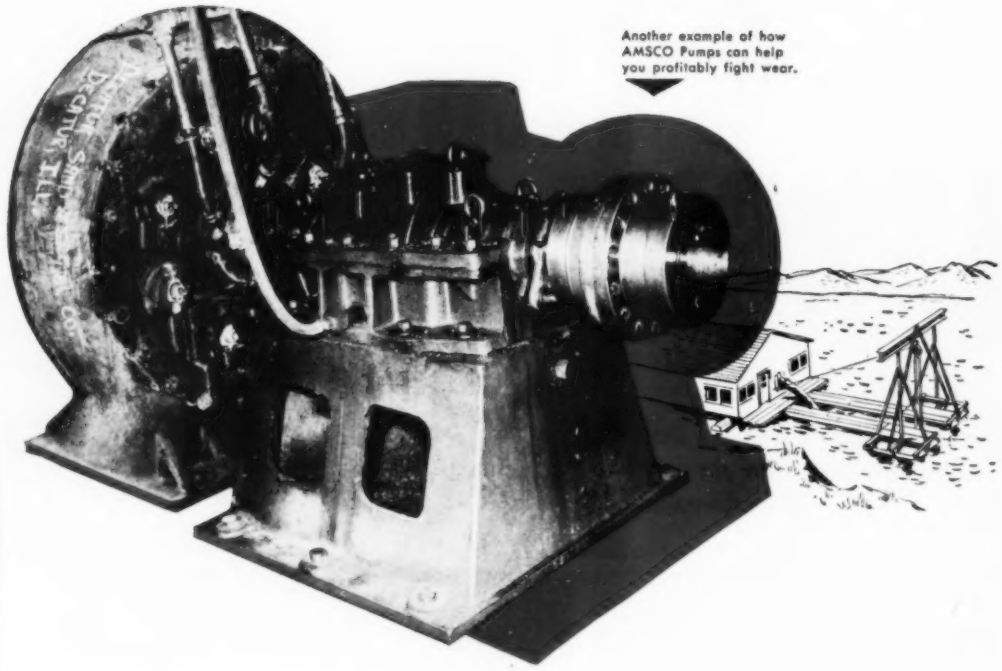
FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor, or write the G.T.M.—Goodyear Technical Man—Goodyear, Akron 16, Ohio.

GOODYEAR

THE GREATEST NAME IN RUBBER

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

PIT AND QUARRY, July, 1951, Vol. 44, No. 1. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $3 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $3 additional for each year. Single copy 50 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879.



Another example of how AMSCO Pumps can help you profitably fight wear.

FOUND: $15,000 on a bearing stand

How a switch to an Amsco Pump increased production — and lowered costs per ton

The Decatur Sand & Gravel Co. in Decatur, Ill. now use an AMSCO Dredge Pump exclusively . . . because they found that even a rugged dredge pump is only as dependable as its weakest part. They formerly used another make of pump that in spite of all precautions averaged 15 days of down time per season—just because of bearing failure. Serious production losses resulted, and in an effort to increase tonnage, an AMSCO Dredge Pump was installed.

RESULT? **Not one bearing failure in the last 4 years! The trouble-free bearings on the AMSCO Pump increased tonnage by 11,000 tons . . . saved about $15,000.00 through higher production and lower upkeep over a 4-year period!**

This is the kind of dependable performance you can expect from AMSCO Pumps. From the suction to the driving coupling, they're built to give you lower handling costs per ton . . . *for a higher return on your investment.*

WHEREVER YOU PUMP MATERIALS THAT CAUSE IMPACT AND/OR ABRASION . . .

. . . find out about longer-lasting, dollar-saving AMSCO Pumps. There's a size and type for every type of materials handling service . . . made by the world's largest producers of Manganese Steel castings for all industry.

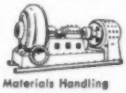
AMSCO controls impact and abrasive wear in 5 basic industrial operations:

Power Transmission

Mining & Excavating

Transportation

Crushing & Pulverizing



Materials Handling

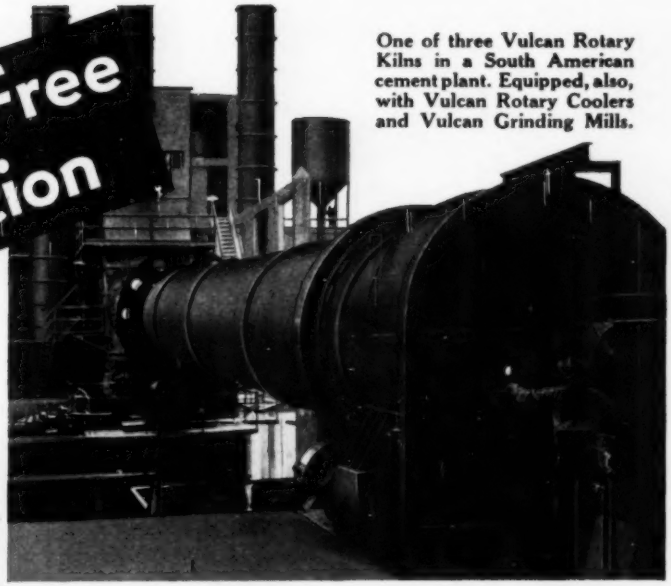
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

396 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

Trouble-Free Operation MAKES



One of three Vulcan Rotary Kilns in a South American cement plant. Equipped, also, with Vulcan Rotary Coolers and Vulcan Grinding Mills.

Vulcan ROTARY KILNS

MORE PROFITABLE IN THE LONG RUN

Thermal efficiency is important and the user of a Vulcan Rotary Kiln can rely upon every heat unit being made to do full duty. Experienced users know, however, that the most important factor in keeping costs down and profits up is continuous trouble-free operation.

Vulcan engineers know that, also, and every Vulcan kiln is designed and built with an extra margin of protection against mechanical troubles of any kind. Some of this extra protection is in our basic designs—better bearings, better tire mountings, better sealing rings, etc., but a lot is due to the fact that every new job is studied carefully for potential trouble spots and measures taken to either eliminate them or provide effective protection against them.

That's where more than fifty years of experience counts and that's why long-time users of Vulcan kilns often order additional units from us without competitive bids. They know that any necessary difference in first cost will be repaid many times over in freedom from breakdowns and maintenance expense.

The whole story of Vulcan achievement in this field would be difficult to put in words but we have a 28-page illustrated bulletin that contains a great deal of valuable information—especially regarding the superior constructional features mentioned above. No charge or obligation—write today for Bulletin 442.

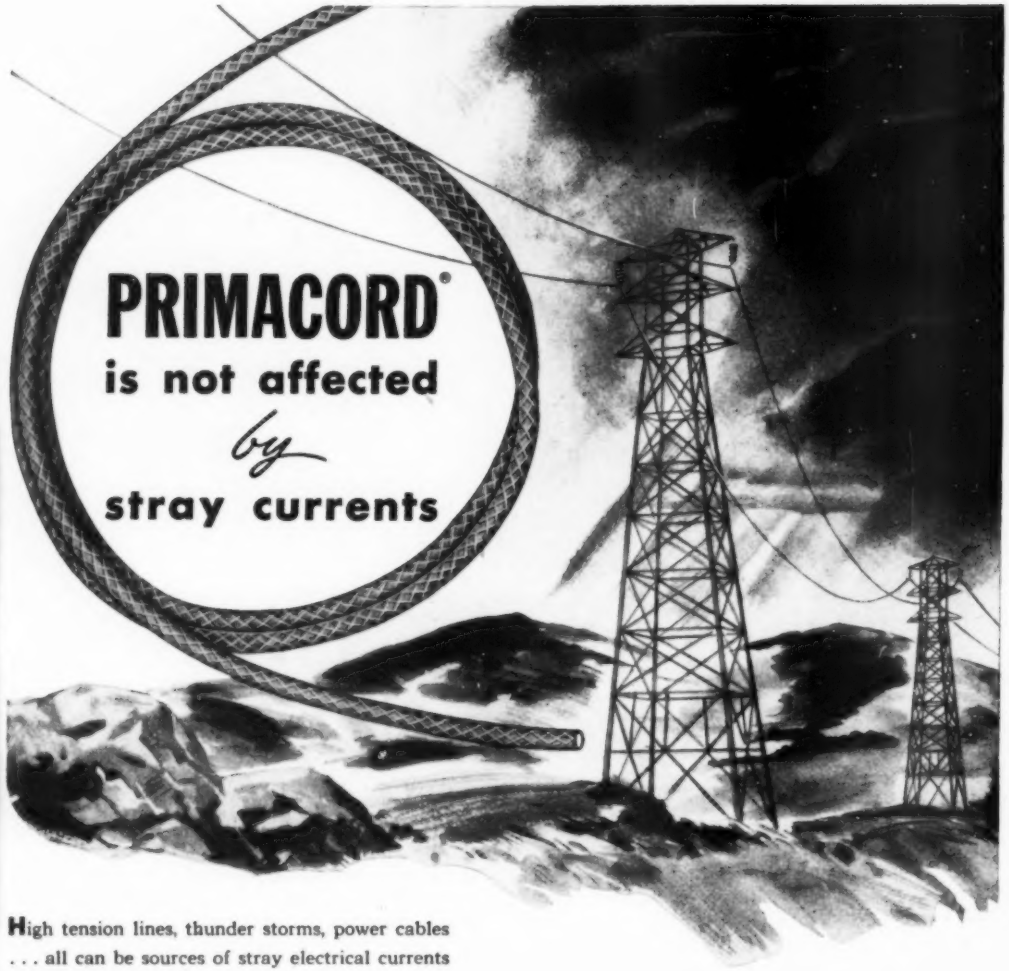
Vulcan Iron Works

Established 1849

WILKES-BARRE, PA., U.S.A.

Cable Address "Vulworks Wilkes-Barre"

Other Vulcan products include Diesel-Electric and Diesel-Mechanical Locomotives, Briquetting Machinery, Electric Hoists, Mining Machinery, Sugar-Mill Machinery and Heavy Special Machinery. Bulletins on request.



High tension lines, thunder storms, power cables . . . all can be sources of stray electrical currents under certain conditions.

When blasting you can guard against them by using Primacord as the primary detonating agent because Primacord is not affected by stray currents, nor can it be set off by friction, sparks, or ordinary shock. It must be detonated to produce the powerful explosive wave which travels at approximately 4 miles per second throughout its length.

Use Primacord from top to bottom in each hole, and to connect all holes. You'll get good shots with more work from your explosives, easier digging and better output.

Reinforced Primacord for trunk lines and deep holes where extra tensile strength and resistance to abrasion are desirable; Wire Countered Primacord for deep, ragged holes and high abrasive conditions; Plastic Reinforced Primacord for very deep, wet holes, river crossings, etc.; Plain Primacord for surface trunk lines and shallow holes. P-54

The Ensign-Bickford Company
Simsbury, Connecticut

PRIMACORD®-BICKFORD

DETONATING FUSE

Also Ensign-Bickford Safety Fuse — Since 1836

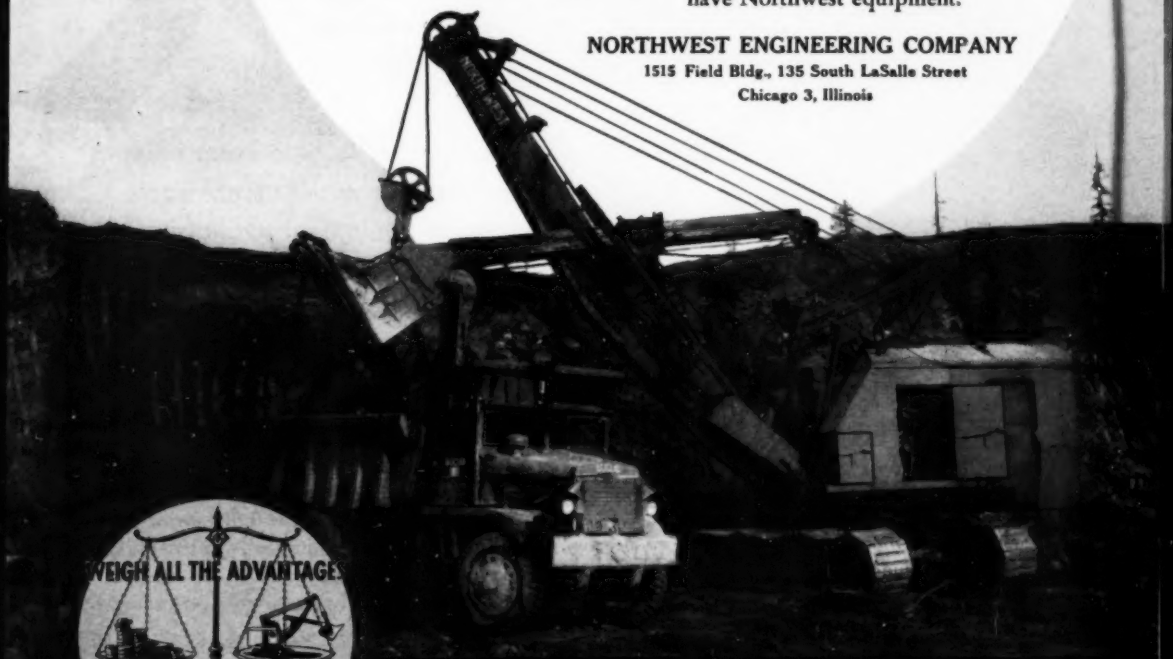
ZONOLITE—
JUST ANOTHER "DIGGING JOB" to a NORTHWEST

ZONOLITE, that queer material that keeps the furnace heat in, in winter, and the sun's heat out in summer, is tough, abrasive digging—but, it's just DIGGING to a Northwest Rock Shovel.

This is one of several Northwests the Zonolite Corporation has put in service—repeat orders that prove Northwest ability in mine service where sustained output is paramount. The Northwest is a hard rock shovel. It is built for the hard jobs and if you have a real Rock Shovel *any* digging is easy.

The Northwest Dual Independent Crowd, Northwest Welded Boom Design, the Cushion Clutch, Uniform Pressure Swing Clutches, and the "Feather-Touch" Clutch Control, make a combination of advantages that cut digging costs—a combination of advantages no other machine can give you. You should check into these features so you can plan ahead to have Northwest equipment.

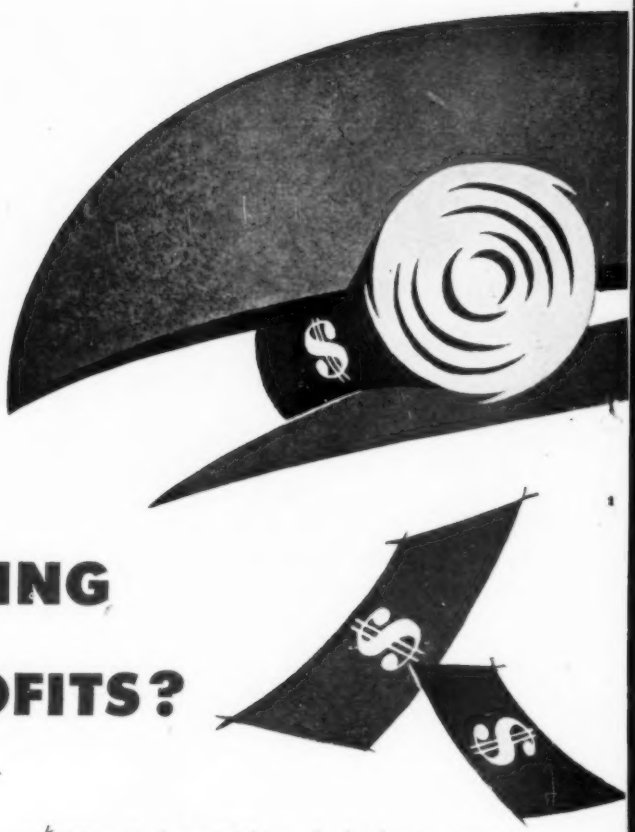
NORTHWEST ENGINEERING COMPANY
1515 Field Bldg., 135 South LaSalle Street
Chicago 3, Illinois



NORTHWEST

Convertible for any Mining Material Handling or Excavation Problem

ARE BIG BILLS SWALLOWING YOUR PROFITS?



Use Delvac Oils to help keep engines clean, reduce maintenance costs, increase equipment availability.

A dirty engine is a *liability*—cuts deeply into your profits because it requires excessive maintenance, keeps expensive equipment unnecessarily idle. To avoid such troubles, use the oils that help *keep engines clean*—Delvac Oils!

Delvac Oils are ideal for both heavy-duty gasoline and Diesel engines. They have unusually high resistance to oxidation, and are exceptionally detergent and dispersive. They hold formation of harmful deposits to a minimum . . . protect rings, pistons, cylinders and bearings against corrosion and wear . . . assure more available power—*rock-bottom upkeep costs!*

Get more work—*more profits*—from your engines with Delvac Oils—recommended or approved by 125 leading engine and equipment builders!

Here's Practical Help for Contractors . . .

Socony-Vacuum gives you . . .

- Help on maintenance problems.
- Individual, tested lubrication schedules.
- Advice on correct application of lubricants, proper handling and storing.
- One source of supply—available everywhere.
- Simplified inventory—with . . .

1. **DELVAC OILS**—for all gasoline and automotive-Diesel engines.
2. **MOBILUBE GX**—multi-purpose gear lubricant for all enclosed gears—manually operated transmissions, rear axles and final drives.
3. **MOBILGREASE**—in grades and types for proper lubrication of all chassis parts and engine accessories.

SOCONY-VACUUM

DELVAC OILS

Correct Lubrication for Contractors

**THE FLYING RED HORSE COMPANIES: SOCONY-VACUUM OIL COMPANY, INC.
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION**

PROFITABLE FRANCHISES AVAILABLE

. . . for the distribution of disposable rock bits

THE PRODUCTS

- one-pass rock bits, *so inexpensive they're thrown away instead of resharpened.*
- bit sizes from
  1¼" to 1⅝" with ⅞" dia. sockets
  1½" to 2⅛" with 1" dia. sockets
  1⅞" to 2⅜" with 1¼" dia. sockets

THE USES

- drilling roof-suspension bolt-holes in coal mines
- quarrying
- open-pit mining
- metal mining
- non-metal mining
- multiple (wagon) drilling
- road-building; heavy construction

THE USER ADVANTAGES

- faster drilling, easier drill-steel preparation
- lower cost per foot of hole
- longer bit life, longer drill-steel life
- smooth, clean holes—less dust fines
- elimination of bit sharpening
- reduces drill bit inventory, and overall cost of drill-steel
- elimination of upsetting on drill-steel increases space for chip removal and minimizes stuck steel in hole

THE MANUFACTURER

- disposable rock bits are made in a new plant fully equipped with modern production machinery. This plant is located near Pittsburgh where raw materials are readily available and transportation facilities will permit quick shipment of rock bits by the keg or the carload.

THE DISTRIBUTOR FRANCHISES

1. Profitable exclusive franchises are available to distributors serving the coal mining, quarrying, metal and non-metal mining industries, road-building and heavy construction fields.
2. These franchises will cover rock bits, drill rods, and bit knock-off tools.
3. The manufacturer will furnish full support with—
   - advertising
   - promotion
   - bulletins
   - exhibits
   - publicity
   - direct-mail
4. Write, wire or phone for full details on territories and exclusive franchise arrangements to Mr. B. William Knepshield.

DRILL BIT AND TOOL COMPANY

NINTH & BINGHAM STREETS, PITTSBURGH 3, PA.

MAKERS OF THE THROWAWAY BIT

A Favorite the World Over!
Teeth that really dig!
Forged heat-treated alloy steel replaceable points
THAT STAY SHARP
GIVE LONGER LIFE
DEPENDABLE SERVICE
H&L TOOTH COMPANY
(Pioneer Manufacturers of Two-Part Teeth)
1540 So. Greenwood Ave., Montebello, California

readily available

AMERICAN
CYANAMID COMPANY
EXPLOSIVES

AMERICAN EXPLOSIVES

You can get quick deliveries of AMERICAN explosives and blasting supplies from our well located plants and distributing magazines. The AMERICAN line includes explosives exactly suited to your requirements—produced under intensive research, close chemical control, and unremitting care in manufacture. Always specify AMERICAN.

Capable Field Engineers
Are Available At Your Call

***High Explosives *Permissibles**

***Blasting Powder *Blasting Accessories**

AMERICAN *Cyanamid* COMPANY
EXPLOSIVES DEPARTMENT
30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

Sales Offices: Pittsburgh, Pa. • Bluefield, W. Va. • Scranton, Pa. • Chicago, Ill. • Pottsville, Pa. • Maynard, Mass.

husky equipment...

The Model 4500 crane, built by Manitowoc Engineering Works, lifts a 4-5 yard drag bucket on a 140 foot boom, or 100-ton working loads at 20 foot radius.

This heavy work requires rugged, dependable component parts. That's why Torrington Spherical Roller Bearings are used on the main drive shaft and dragline countershaft assemblies, and Torrington Radial Roller Bearings on the front drum shaft.

Self-Aligning Spherical Roller Bearings prevent binding stresses by compensating for shaft deflections caused by shock loads. All Torrington Bearings are precision-made from specially selected steels, carefully heat-treated to assure high load capacity and long, reliable service.

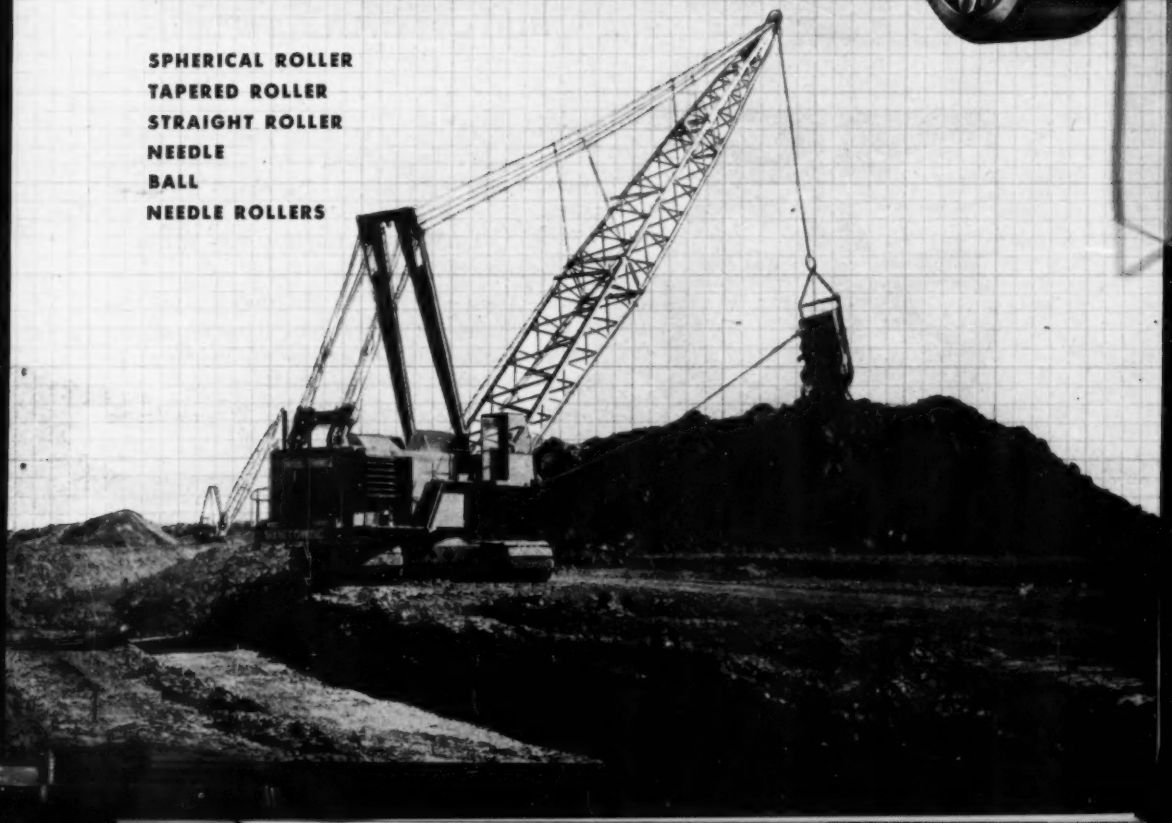
Torrington engineers have had many years of experience in helping to apply all major types of anti-friction bearings and will be glad to work on your problem.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District Offices and Distributors in Principal Cities of
United States and Canada

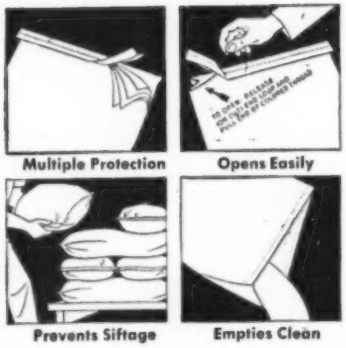
TORRINGTON BEARINGS

TORRINGTON BEARINGS

SPHERICAL ROLLER
TAPERED ROLLER
STRAIGHT ROLLER
NEEDLE
BALL
NEEDLE ROLLERS



The time has come the Walrus said To talk of many things of Ships and Planes...Production Pains and everything it brings



"EVERYTHING," in the national emergency, can include whatever you make and ship. Overnight it might mean changes in type of design of your containers.

So the Union Multiwall Specialist (the Walrus, if you like) is ready to help you meet any such problem.

When you invite a Union Multiwall specialist to study your packaging, there's no obligation of any kind. But now, more than ever, you'll find his packaging engineering know-how valuable to you.

Better be safe . . . better be sure . . . better welcome the Union representative when he calls!

UNION Multiwall Bags

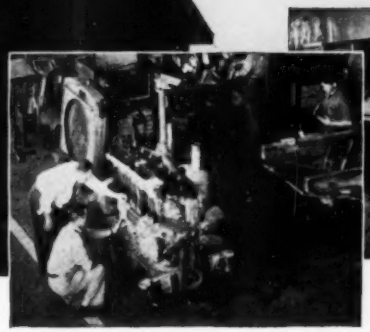
UNION BAG & PAPER CORPORATION

233 BROADWAY, NEW YORK 7, NEW YORK

Offices in: CHICAGO, ILL. • MINNEAPOLIS, MINN. • KANSAS CITY, MO. • HOUSTON, TEXAS • BALTIMORE, MD. • ATLANTA, GA.

Your strong right arm...

in time of need



BECAUSE of the vast defense mobilization program, material shortages and extra production demands have gripped the nation. They affect particularly the heavy industries and the distributors and users of their products. And huge as America's facilities have become in recent years, they still are not large enough to keep pace with both military and civilian needs.

Nevertheless, as an owner of "Caterpillar" products, you are among the more fortunate. Your "Cat" equipment has been built for long life and to withstand severe working conditions. What's more, it is backed by a dealer organization that is world-famous for experience, accessibility, mechanical facilities and field service to keep you going "come hell or high water."

Since World War II, the already large number of "Caterpillar" sales-and-service establishments has increased greatly. Also since that time, "Caterpillar" and its dealers have developed new techniques for restoring and extending the life of "Caterpillar" products. Today, in their own shops, "Caterpillar" dealers can *rebuild* a great many worn or damaged parts which formerly required completely new replacement. In short, every dealer is richly acquainted with scores of modern ways and means for keeping your machines in good working condition. You can help by doing this:

Take your maintenance problems to your "Caterpillar" dealer* BEFORE *parts are worn beyond repair

Remember that excessively worn parts can cause damage to mating parts; that track parts, pistons and liners, crankshafts, cylinder heads, radiators and other items usually can be salvaged. Your problems are your dealer's problems. Go see him today. He'll do everything in his power to keep your machines operating. Your combined efforts will be reflected in longer equipment life.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

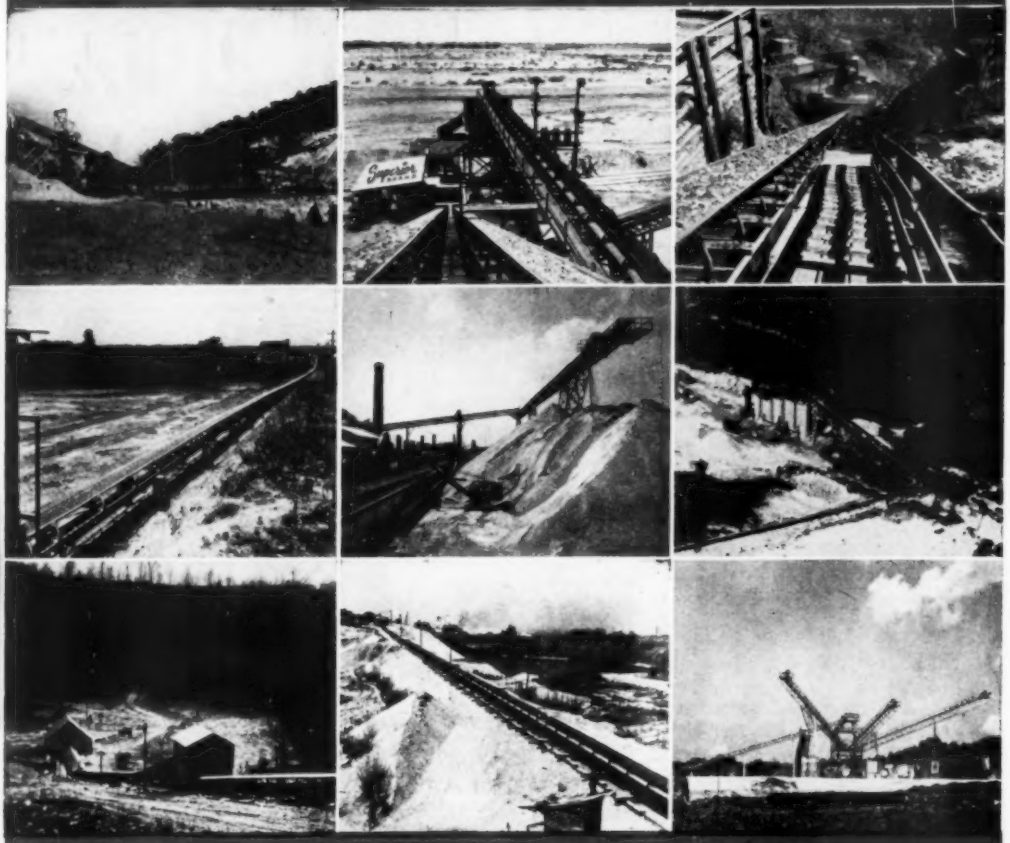
REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

STONE HANDLING!

These are rough jobs—requiring sturdy equipment for long life and uninterrupted service.

That's why these operators specified **Continental**



OTHER PRODUCTS: Elevators, Feeders, Screw Conveyors, Pulleys, Trippers, Buckets, Sprockets, Takeups and Bearings.

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

Memo

For men who watch production Costs!

High costs in loading will be reduced by using the Eimco 104. This heavy duty loading machine will load more rock, sand or gravel in less time and at lower cost. The 104 is easy to operate and maintain — it digs in the front and discharges overhead to the rear. Models are available with either Diesel or electric motive power.

Contractors and construction men are turning to the 104 for higher production at lower costs.

An Eimco Engineer is available to discuss your loading problem — write for information.

EIMCO

THE EIMCO CORPORATION

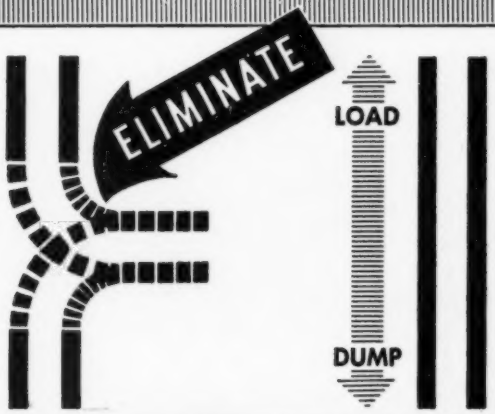
The World's Largest Manufacturers of Underground Rock Loading Machines

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK, 51-52 SOUTH STREET • CHICAGO, 3319 SOUTH WALLACE STREET
BIRMINGHAM, ALA., 3140 FAYETTE AVE. • DULUTH, MINN., 216 E. SUPERIOR ST.
EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIFORNIA, P. O. BOX 240
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD



SAVE THREE WAYS:

1. Eliminate wasted time in turning to dump.
2. Eliminate track and roller wear in turning.
3. Speed up loading with Eimco Rocker-arm principle.

LIFELINES

THROUGH LOW-COST AGGREGATE

THE vast networks of American railroads and highways are the arteries of the nation, carrying the output of factories, farms, mines and forests, providing the lifeblood for national security and progress.

America on wheels rolls on aggregate . . . hundreds of millions of tons of aggregate that must be produced at *the lowest possible cost per ton* for UNLIMITED CONSTRUCTION of the high speed roadways so urgently needed.

Cedarapids equipment provides American contractors with the means to keep aggregate production costs at lowest levels . . . consistent big volume output, long-life construction, low operating and maintenance costs, and high quality finished products that meet exacting specifications.

Cedarapids equipment brings OPPORTUNITY UNLIMITED to *you* with bidding advantages you can depend on to beat competition. For complete plants or single units . . . for producing either aggregate or black top . . . see your Cedarapids distributor for details.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

UNLIMITED

THE UNITIZED PLANT fits all aggregate requirements! The four basic units . . . primary crushers, scalping units, secondary crushers and wet or dry screening units . . . can be used alone or in any combination to produce anywhere from 25 to 250 tons per hour, and more, of any type of aggregate, from riprap to agstone.

MODEL "FA"
The most portable of the Iowa line of bituminous mixing plants, the Model "FA" is quality built for accuracy of mix and low cost operation on a big variety of work. There's a size and type of Cedarapids plant for every black top job . . . the Model "E" for the biggest to the Patchmaster for the smallest.

Photo by Ewing Galloway

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

Shop
Look
Listen

. . . . a good policy to follow when you're buying Cement Plant Machinery

SHOP carefully when you're in the market for new Cement Making Machinery. Make a close comparison of the *smallest details* of construction of the various makes of equipment. Traylor Machinery has a great record for dependability and economy of operation . . . the direct result of the close attention paid to the design and manufacture of every part.

LOOK at cement plant installations that have been in service long enough to prove their dependability. For almost half a century, Traylor Cement Plant Machinery has been in operation throughout the world. Today, Traylor is a byword for operating efficiency and high product quality wherever cement is produced.

LISTEN carefully to the men who know Traylor best . . . the men who operate Traylor Cement Plant Machinery. You, too, will buy Traylor Equipment.

a Traylor leads to greater profits

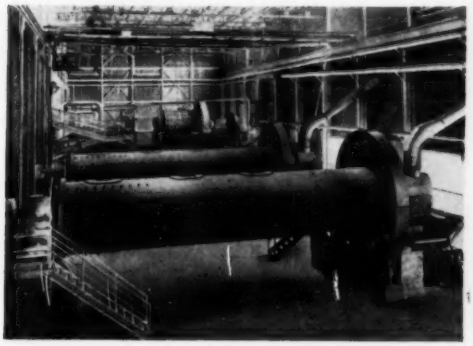
Two 54" Traylor Gyratories . . . one in Montreal, the other in Great Britain . . . are among the largest of this type of crusher in service in the cement industry. Traylor is now fabricating two more of these large 54" Gyratories for the Canadian Cement Manufacturer. Many other Traylor Gyratories of smaller size are operating in numerous cement plants scattered throughout the world. This type of Traylor Crusher is well known for its extremely low power-per-ton requirements when used in the most rugged primary service.

Traylor

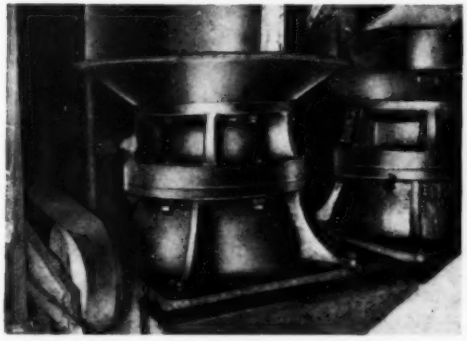
Rotary Kilns, Coolers and Dryers
Grinding Mills . Crushing Rolls
Jaw, Reduction and Gyratory Crushers
Apron and Grizzley Feeders

CEMENT

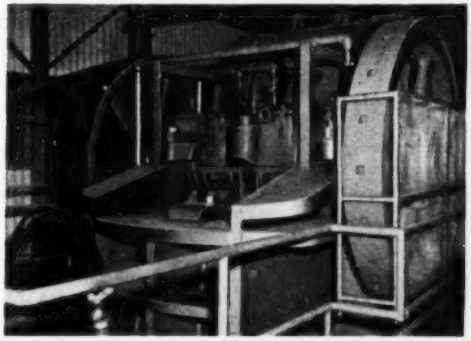
THIS 10'0" x 400'0" Rotary Kiln, shown operating in a Western cement plant, is one of several Traylor Kilns owned by the same company. One sure indication of the dependability of Traylor equipment, is the number of customers who return to Traylor time after time for all types of Cement Plant Machinery.



TWO 8'0" x 40'0" three compartment mills and two 9'6" x 10'2" Ball Mills which are operating in a Rocky Mountain area Cement Plant. These mills are owned by a Traylor customer who operates many other pieces of Traylor Machinery. Traylor builds Ball Mills for both raw and finished grinding. One Traylor customer is operating a total of 27 Traylor Ball Mills in plants in 3 different states.



TWO Traylor TY Reduction Crushers employed in a California Cement Plant. The Traylor TY Crusher requires little floor space . . . little head room. Its compact design incorporates maximum strength, great efficiency and easy maintenance. The Traylor TY Reduction Crusher also uses curved crushing surfaces to obtain an extremely favorable output-to-horsepower ratio.



THIS 36" x 42" Traylor Jaw Crusher is in primary service in a West Virginia Cement Plant. Traylor builds 5 types of Jaw Crushers in 34 different sizes. All Traylor Jaw Crushers are standard equipped with Traylor's Curved Jaw Plates that reduce choking and packing . . . drastically cut power costs per ton. These curved crushing surfaces account for greater capacities at finer settings . . . will outlast ordinary plates as much as 3 to 1.

TRAYLOR ENGINEERING & MANUFACTURING CO.
368 MILL ST., ALLENTOWN, PA.
Sales Offices: New York, N.Y.; Chicago, Ill.; Los Angeles, Calif.
Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

MACHINERY

SEND FOR Bulletin 5121 which contains full data on Traylor Machinery for the Cement Industry. Sign your name below for your copy.

Name _____

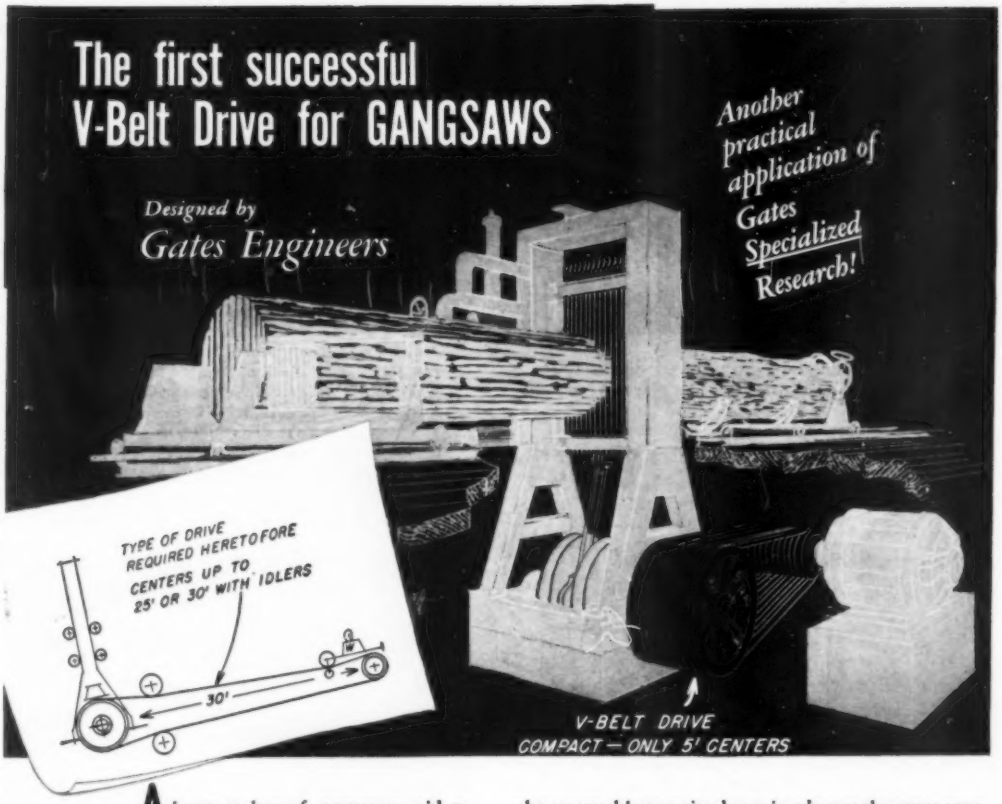
Company _____

Address _____

The first successful V-Belt Drive for GANGSAWS

Another practical application of Gates Specialized Research!

Designed by
Gates Engineers



A large maker of gangsaws said to Gates Engineers, "If you can design a V-Belt drive to handle the *fluctuating load* on a gangsaw, we can discard the long and troublesome flat belt that we have always thought we had to use."

The *reasons* for his statement are quickly told:—

A gangsaw (or Swedish type Gang Mill) consists essentially of several saw blades mounted in a heavy steel frame or "sash" that moves rapidly up and down like a monster jig saw. This sash may weigh a ton or more—yet it makes about *five* 24-inch *up* and *down strokes per second!*

On the *up* strokes, the saws have no cutting load on them. But on the *down* strokes they must often slash a log up to 36" diameter into 2" planks. This great unbalance in load between the *up* and the *down* strokes has heretofore defeated all efforts to apply a V-Belt Drive to saws of this type.

After thoroughly analysing the fluctuating load on gangsaws, Gates Engineers recommended very minor changes in design which would permit the application of V-Belts and—what is of *utmost importance to you*—they were able to write down *in advance* the exact specifications of the V-Belt Drive that has very successfully handled this extremely difficult assignment.

This *pre-solution* of drive design problems is possible because Gates operates the largest V-Belt testing Laboratories in the World—and Laboratory findings are carefully checked by tests made under actual field conditions. Finally, the *results* of these exhaustive tests are immediately reduced to *usable data* for the design of V-Belt drives to *perform whatever task may be required.*

Phone a Gates Field Engineer

If you have a difficult drive to design, or if some drive in your plant is giving trouble, or if you only want to be sure what size and construction of V-Belts will give the most efficient and the lowest cost service on any particular drive—you have only to phone a Gates Field Engineer, *always near you* in all industrial centers.

Just look in your phone book under "Gates Rubber." A Gates Field Engineer will come right to your plant and put at your service the full benefits of Gates V-Belt knowledge and experience *without the slightest obligation!*

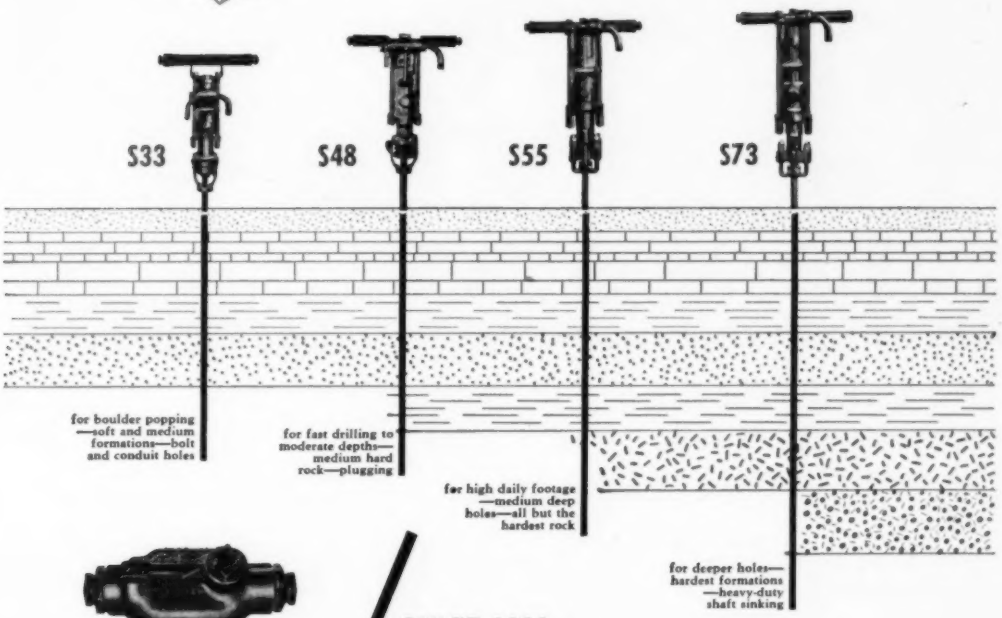
ENG. 515

Gates
Hose V-Belts
Molded Rubber Goods
for Industry

VULCO ROPE **DRIVES**
ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

any kind of rock costs less to drill with GARDNER-DENVER sinkers

No matter what kind of rock you find underfoot —there's a Gardner-Denver Sinker of the correct weight and power for lower drilling costs. Every model is designed for fast penetration—powerful rotation—clean blowing—easy holding—low air consumption. Bulletin HHD-11 gives all the facts. Send for your copy today.


S33
S48
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for boulder popping —soft and medium formations—bolt and conduit holes
for fast drilling to moderate depths—medium hard rock—plugging
for high daily footage —medium deep holes—all but the hardest rock
for deeper holes—hardest formations —heavy-duty shaft sinking

Drills can't run dry when the LO12 Automatic Oiler guards your air lines. It stops the flow of air when it runs out of oil.

SINCE 1859

GARDNER-DENVER

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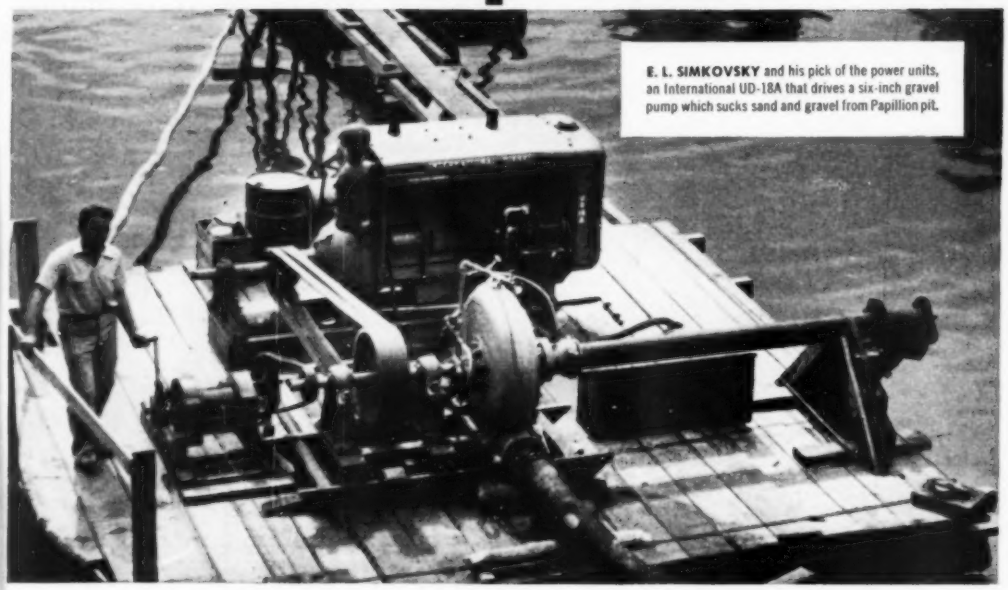
In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

SOME PUMPIN'
at Papillion



E. L. SIMKOVSKY and his pick of the power units, an International UD-18A that drives a six-inch gravel pump which sucks sand and gravel from Papillion pit.

New Gravel Pit Owner Finds International UD-18A Backs Up His Judgment in Picking an Engine

"I looked them all over before I bought an engine for my first sand and gravel plant," says E. L. Simkovsky of the Richland Sand & Gravel Company, Papillion, Nebraska.

"I studied power curves and fuel consumption charts. I visited a lot of installations. I wanted the best.

"And I got it—an International UD-18A. The power is even more than I hoped for, and it's very easy to start and economical to run. It has backed up my judgment in every way."

If you're like Mr. Simkovsky—if you want to be shown—get all the facts before you buy. Add them up—then you be the judge. See how International Diesels come out on top by any comparison test.

Need technical information? Your International Industrial Distributor or Power Unit Dealer has the answers. He also has the service facilities, the trained mechanics and the International parts supply. Get acquainted with him!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS

INTERNATIONAL HARVESTER

INTERNATIONAL

more hauls, lower maintenance costs

Gulflube Motor Oil H.D.

says this Superintendent

"Our trucks work on an exceptionally heavy schedule", says the Superintendent of this trap rock quarry. "As a result, we don't get a chance to service them as often as we'd like. But there are two maintenance practices that we follow religiously. We use a high quality detergent motor oil — Gulflube Motor Oil H.D. — and change it regularly. This practice has paid us dividends. After two years of operation, our engines are remarkably clean. We've had no stuck or fouled rings, and no delays attributable to lubrication."

A typical statement from one of the hundreds of operators of heavy-duty trucks who use Gulflube Motor Oil H.D. Year after year they find that it keeps engines clean, keeps wear to a minimum—keeps maintenance costs down.

Ask a Gulf Lubrication Engineer to tell you more about Gulf's new detergent motor oil, Gulflube Motor Oil H.D.. Also ask for a copy of the booklet, "Gulf Periodic Consultation Service," which tells about Gulf's advanced cooperative service for users of petroleum products. Write, wire, or phone your nearest Gulf office today.

Gulf Oil Corporation • Gulf Refining Company

GULF BUILDING, PITTSBURGH, PA.

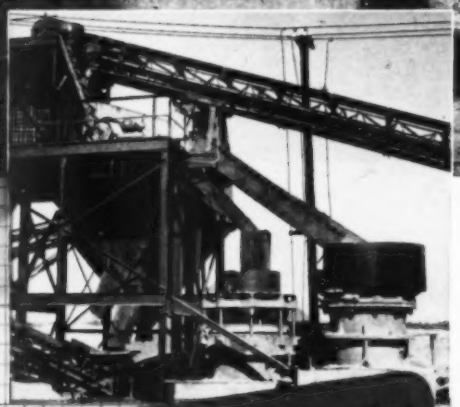
FIFTY YEARS OF SERVICE

1901 GULF 1951

PETROLEUM AND ITS PRODUCTS

TELSMITH ENGINEERED

for High Capacity... and Super Flexibility



TELSMITH equipment in this Plant

One (1) 36" x 6' Heavy-Duty Plate Feeder

One (1) 5' x 12' Heavy-Duty 2½-Deck Scalping Screen

One (1) 16-B Gyratory Crusher

One (1) 42-S Gyrasphere Crusher

Five (5) Vibro-King Finishing Screens: 5' x 12', 4' x 12', 6' x 10' Triple Decks; 4' x 12' Double Deck

Nine (9) Telsmith-BG Conveyors 30" to 12" wide and 266' to 43' long

Barbers Corners Crushed Rock, Washed Sand and Gravel Plant of the Elmhurst-Chicago Stone Co., Elmhurst, Illinois. (Top) one of several Telsmith Vibro-King Screens; (left) Telsmith Scalping Screen, Gyratory and Gyrasphere Crushers.

FIVE-WAY EFFICIENCY—(1) High Capacity... (2) Super Sizing-Flexibility... (3) Simplified, Automatic Controls... (4) Large Storage Capacity... (5) Fast Truck-Loading... makes this plant unique. Because it is not only Telsmith engineered but largely Telsmith equipped.

THREE-SECTION DESIGN—This outstanding sand and gravel plant can produce—In Section One, minus 1" pit-run road gravel. In Section Two, four sizes of washed gravel, and sand. In Section Three, five sizes of crushed gravel and one of aglime. This three-section plant consistently and economically produces 350 tons per hour.

CONSULT TELSMITH ENGINEERS for newest developments in aggregate production. Send for Bulletin 266.

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17 — 211 W. Wacker Dr. Chicago 6, Ill. — 713 Commercial Trust Bldg. Philadelphia 2, Pa. — 235 Main St. Cambridge 42, Mass. — A. N. Wigle Columbus 13, Ohio

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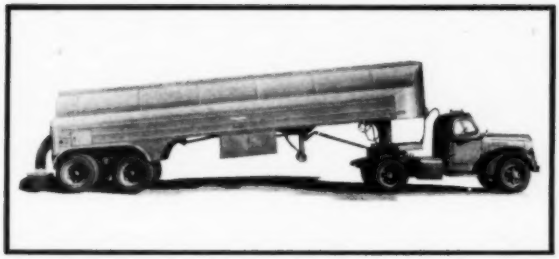
GRAMM BULK CEMENT TRAILERS

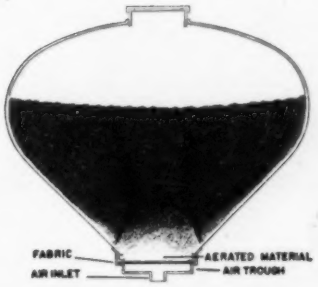
featuring GRAMM *"Air Slide"*

FOR HAULING OF CEMENT

and other dry, powdered materials



A Gramm "Tank-Type" Bulk Cement Trailer Equipped with Gramm "Air-Slide".



Gramm "Air-Slide" method of aeration makes dry bulk materials flow like water. By supplying air at low-pressure through a specially made fabric panel, cement virtually "liquifies." The material then flows by gravity on a low degree of incline.

Gramm Aerated trailers provide positive material discharge at any desired speed up to 25 barrels per minute.

TWO MODELS—Gramm Bulk Cement Transport Trailers are available in two basic models with a variety of optional features to meet individual needs.

The Gramm "Tank-Type" model (shown above) has a simple hydraulic lift mechanism—built as an integral part of the trailer. With this model it is possible to achieve the desired low angle of incline quickly and easily without effecting any required weight distribution.

Gramm Bulk Cement Transports are available as trains (above), semi-trailers, or truck-mounted units.

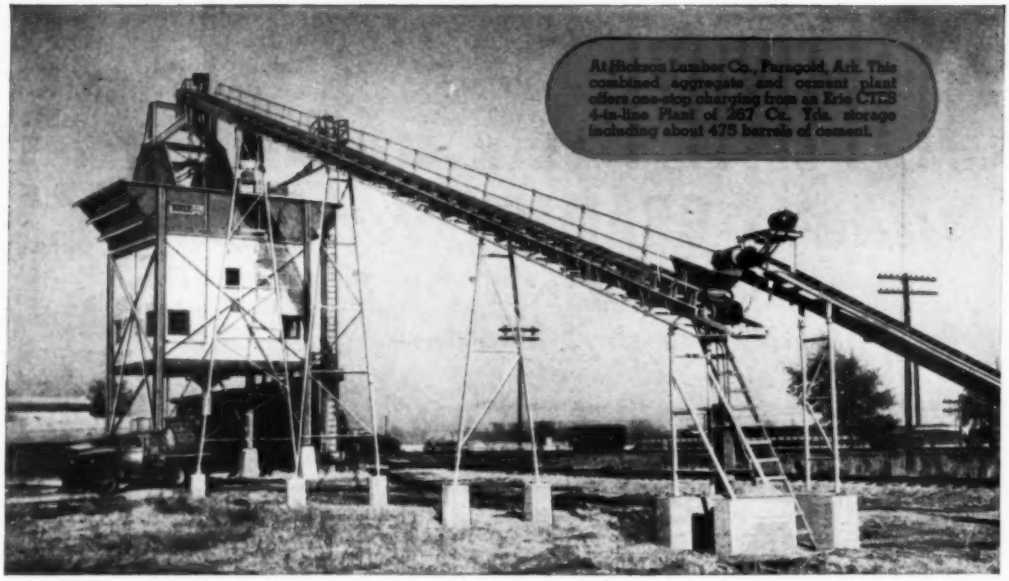
SIMPLICITY—The principle of Aeration is simplicity itself. And as this revolutionary new process of unloading powdered materials offers so many advantages and benefits in many applications, old conventional methods are now obsolete.

ECONOMICAL—No moving mechanical parts in contact with abrasive cement means lower maintenance cost and freedom from equipment lay-up. Aeration requires less power than other methods—no expensive screws to drive and maintain, saving on operating costs. Fast loading and quick discharge provide a more efficient and flexible operation.

EFFICIENT—GRAMM Aerated units provide positive material discharge at any desired speed with Fingertip control up to 25 barrels per minute. Discharge can be controlled from either side of unit at rear by the driver-operator of the unit. All parts are easily accessible and there are no moving or wearing parts within the load-carrying or discharge space.

FLEXIBLE—GRAMM "Air-Slide" is applicable to handling a wide range of pulverized materials and provides instantaneous control in the discharge rate. These units are ideal for trouble-free transport or as large mobile storage of materials. Nearly 50 firms, all over the world, are successfully operating Gramm Bulk Cementers. Write today for complete information.

GRAMM TRAILER CORPORATION | ***FIRST LIMA BUILDING LIMA, OHIO***



At Hickson Lumber Co., Paragold, Ark. This combined aggregate and cement plant offers one-stop charging from an Erie C-T-S 4-in-line Plant of 267 Cu. Yds. storage including about 475 barrels of cement.

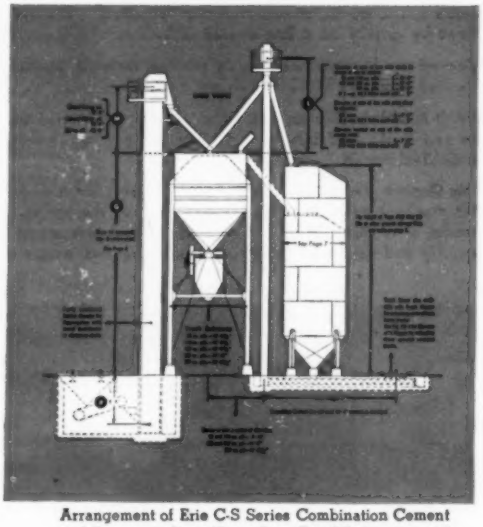
ERIE C-S SERIES *Combination* BINS

Offer 10 Compartment Arrangements

These Combination Aggregate and Cement Bins are of the knock-down semi-portable type. We build them in standard sizes with either 3 or 4 compartments in line. To meet special storage conditions we also build C-S Combination bins in 10 different top partition arrangements that provide almost any degree of material classification.

The advantage of having up to 475 barrels of cement alongside aggregates in one bin makes for economy and fast one-stop charging of materials. Auxiliary connected cement storage may be provided by the addition of Ground Storage Bins.

For extra high truck clearance required of large Central Mixing Plants or Concrete Products Plants 11 ft. additional column height, over the standard 20 1/3 feet, is available.



Arrangement of Erie C-S Series Combination Cement and Aggregate Bin with auxiliary Erie Silo-type ground storage of cement interconnected to main plant.

WRITE FOR BULLETIN C-S

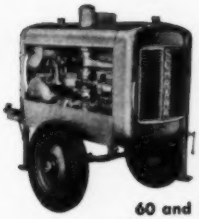
ERIE

STEEL CONSTRUCTION COMPANY

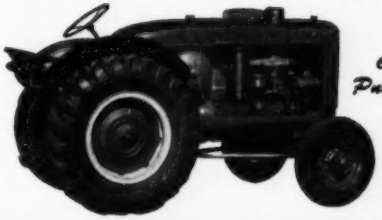
617 GEIST ROAD • ERIE, PENNSYLVANIA

from the ground up—

20 and 35



60 and 105
Pneumapower



60 and 105
Pneumatractor

There's a SCHRAMM Air Compressor to fit your air needs!

MODELS 20 and 35... for Tire Inflation, Scaling, Impact Wrenches, Grease Guns, Paint Sprays and Road Markers.

MODELS 60 and 105 Pneumapower . . . For jobs where large compressors are not required; Riveting, Tamping, Waterproofing, and Insulating.

MODELS 60 and 105 . . . *Pneumatractor* Self-Propelled. For Trench Work, Loading and all air applications.

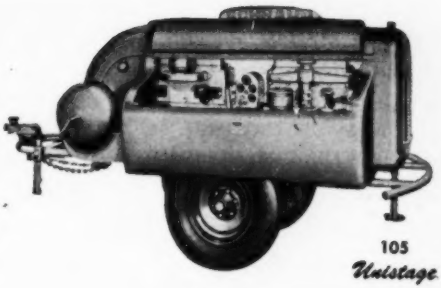
MODEL 105 Unistage . . . Equipped with large size tool boxes capable of hauling complete assortment of construction tools.

MODELS 210, 315 and 600 . . . Large compressors for operating multiple tool combinations on big engineering projects.

TO GIVE YOU A COMPLETE PACKAGE

The Schramm line of Construction Tools includes: Rock Drills . . . Wagon Drills . . . Paving Breakers . . . Clay and Trench Spades . . . Backfill and Tie Tampers . . . Track Spike and Form Pin Drivers . . . Sheeting Drivers . . . Chain Saws . . . Concrete Vibrators . . . Paint Sprays . . . Tools for Breakers and Diggers . . . Air Hose and Accessories.

REMEMBER. There's a Schramm Air Compressor and auxiliary tools available for your many compressed air needs. For complete details, write today.



105
Unistage

210, 315 and 600
Unistage

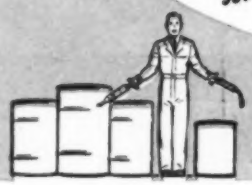
SCHRAMM INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

CUT LUBRICATION COSTS with this ONE Multi-Purpose Grease!

"Using LITHOLINE® saves several greases and guns!"



Now you can do all lubricating jobs just as well *if not better* with one grease and one gun, using Sinclair LITHOLINE.

Using Sinclair LITHOLINE is the modern, fool-proof, money-saving way to handle all your lubrication jobs. LITHOLINE converts servicing time into production time.

ADVANTAGES OF LITHOLINE over specialized greases:

- SUPERIOR LUBRICATION AT EVERY POINT
- No danger of costly misapplication
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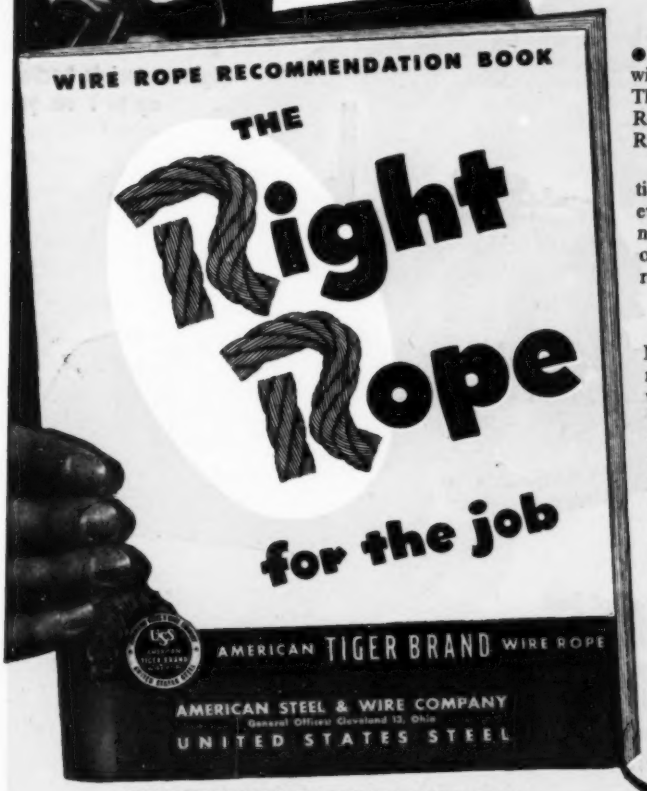
Send for free folder describing demonstrations showing superiority of LITHOLINE. Write to your nearest Supplier of Sinclair Products or direct to Sinclair Refining Company, 630 Fifth Ave., New York 20, N. Y.

SINCLAIR LITHOLINE *for every lubrication job*

This New Book can save plenty of money for YOU!

IT SHOWS YOU HOW TO BE A BETTER BUYER OF WIRE ROPE



● Here is a book that every user of wire rope should have in his file—The American Tiger Brand Wire Rope Recommendation Book, "The Right Rope for the Job."

It covers all industries—construction, mining, petroleum, marine—even aircraft control cable. There are numerous photographs, plus listings of equipment and the types of wire rope that should be used.

For Special Applications

Naturally, there will be applications not covered in the book. For these we maintain a staff of Tiger Brand Wire Rope Specialists — engineers who can help you select the wire rope which will fit your particular needs. These men are constantly working with users of Tiger Brand Rope . . . saving them money and eliminating trouble by properly specifying wire rope.

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Please send me your Recommendation Booklet, "The Right Rope for the Job."

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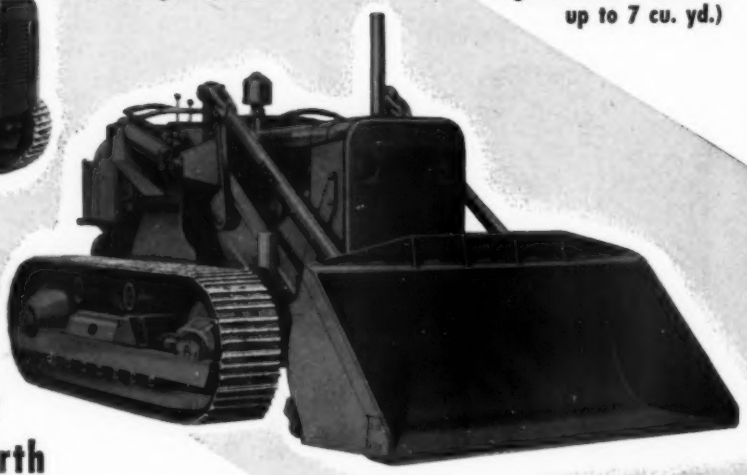
UNITED STATES STEEL

NOW . . . . . Front-End of New ALLIS-

1-Yd. HD-5G
Drawbar hp.: 40.26
Dumping height*: 9 ft. ¼ in.
Total Weight: 16,200 lb.

Standard Buckets up to 4 cu. yd.
(light materials buckets up to 7 cu. yd.)



The Newest, Finest Tractor Line on Earth

The new Allis-Chalmers tractors are not just refinements of existing models . . . *they are new from the ground up* . . . without compromise anywhere in design or materials. Back of their design are your own ideas and those of your operators and mechanics. These are combined with the vast experience of Allis-Chalmers to set new standards of Performance, Durability, Simplified Servicing, Ease of Operation.

2-Yd. HD-9G
Drawbar hp.: 70
Dumping Height*: 11 ft. 4½ in.
Total Weight: 29,800 lb.

Get the full story from your ALLIS-CHALMERS DEALER

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.
Originator of the Torque Converter Tractor

Shovels for the Complete Line CHALMERS Tractors

14 Interchangeable Attachments

- Standard Buckets
- Light Materials Buckets
- Heavy-Duty Buckets
- Rock Forks
- Bulldozer Blades

Plus other attachments for some models

Introducing a New Era of Tractor Usefulness

These new Tractomotive shovels on the larger size Allis-Chalmers tractors now bring you the same wide utility, the same outstanding performing ability as the popular HD-5G—the Tracto-Shovel that revolutionized excavating and material handling.

3-Yd. HD-15G
Drawbar hp.: 102
Dumping Height*: 12 ft. 8 in.
Total Weight: 40,000 lb.

4-Yd. HD-20G
Hydraulic Torque Converter Drive — 175 net engine hp.
Dumping Height*: 13 ft. 5 in.
Total Weight: 61,600 lb.

*Height of bucket hinge

KEY COG.. IN PRODUCTION

at the WALKER STONE CO.

• From what was once useless land, a steady stream of building stone, road aggregate and agricultural lime rolls out of the Walker Stone Company quarry at Junction City, Kansas.

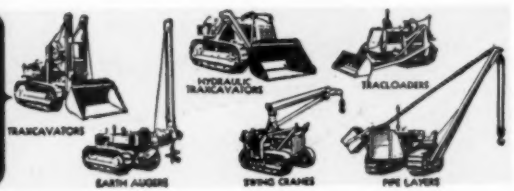
Sam Walker, owner of the thriving enterprise, mechanized the operations in 1945. Loading cog of the new equipment fleet is a versatile T6 **TRAXCAVATOR** on a Caterpillar D6 Tractor. The results have been a fourfold increase in total production.

The T6 helps on the stripping—taking on heaped loads of overburden with the positive push of ground gripping traction.

Then the tough T6 moves to the loading tasks—scooping the heavy shot-rock... placing it carefully and accurately into the hauling units. In its spare time this **TRAXCAVATOR**-Caterpillar team manages the crushed rock stockpile—quickly getting the crushed material into trucks.

These tractor shovels can step up your production, too. Available in five models with capacities from ½ to 4 cubic yards, **TRAXCAVATORS** offer an exact fit for your operations. Your **TRACKSON** — Caterpillar Dealer can tell you all about it. Call on him today—or write TRACKSON COMPANY, Dept. PQ-71, Milwaukee 1, Wisconsin.

TRACKSON
TRACTOR EQUIPMENT



Amateur standing...
in need of an expert!

BAGS FOR ALL INDUSTRY AND AGRICULTURE

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- Saxolin open mesh bags
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- cotton bags of all kinds
- combination bags, liners and specialties

Your bag requirements also will best be served —if you'll call in an expert. Your container should be designed to protect YOUR product . . . to best reflect the quality of YOUR product. Your Chase Salesman is technically trained. He knows his business . . . and how to apply it in the best interests of *your* business. Call him in. He is supported by more than 100 years of experience in providing better bags for American industry and agriculture.

SINCE 1847

for Better Bags...Better Buy Chase

CHASE BAG CO. GENERAL SALES OFFICES: 309 W. JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • WORCESTER, MASS. • CROSSETT, ARK. • SAN FRANCISCO

HERE'S WHAT USERS SAY ABOUT THE DEMPSTER-DIGGSTER—

"IT'S THE FASTEST, MOST EFFICIENT EXCAVATING TOOL I HAVE USED"

—A. J. METLER, *Contractor*

"During the past several years," Mr. Metler says, "I have owned and operated four conventional full revolving crawler and truck mounted shovels and cranes and know that they have a direct application to many types of excavating work.

"On the other hand, I have learned that the fast operation of the tricycle mounted Dempster-Diggster permits it to be used on certain types of work to a considerable advantage. Its mobility permits quicker transfer from one job to another.

"I have had excellent results from the Dempster-Diggster and consider it the fastest and most efficient excavating tool I have used."

Mr. Metler is one of the many contractors who has found the Dempster-Diggster to be "the fastest and most efficient excavating tool" available.

This speed and efficiency in excavation work is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, its hydraulic steering and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, easy, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the Diggster, of course, can move at the fastest possible speed on the job and to and from jobs.

The Type HL Dempster-Diggster is equipped for extraordinary high dumping. The bottom of bucket is 13 feet six inches above ground.

HERE IS THE NEW TYPE HL DEMPSTER-DIGGSTER shown excavating with a 1¼ cu. yd. (heaped) digging bucket. The Type HL Dempster-Diggster will dig through an 18 foot bank while the Type GRD digs through a 15 foot bank.

The Dempster-Diggster is a "must" for contractors, large or small operators alike.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and 1¼ cubic yard (heaped) capacities, and materials handling buckets in 1½ and 2 cubic yard (struck) capacities.

For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.

"I have not personally used the Dempster-Diggster mounted on crawler treads," Mr. Metler said, "but have seen it in operation on jobs adjacent to mine. I know it is a very effective tool and has many applications."

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowing reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Pound for pound, the Dempster-Diggster will out dig and out load any other available competing machine in tough going! Let us prove that statement!

Write today for complete information and prices. The Dempster-Diggster is a product of Dempster Brothers, Inc.

This is the type GRD Dempster-Diggster, which Contractor A. J. Metler considers "the fastest and most efficient excavating tool I have used." It is shown digging 15 inches below grade.

DEMPSTER DIGGSTER

DEMPSTER BROTHERS

271 N. Knox

Knoxville 17, Tennessee

Mobilizing Quarry Equipment

THE URGENT CALL for more output is demanding optimum capacity from every piece of equipment, with downtime cut by more efficient maintenance. This new pressure for production has turned many additional operators and operating men to Cities Service lubricants because:

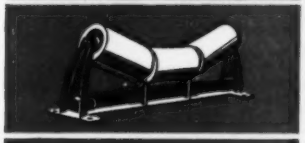
1st—The complete Cities Service line affords correct lubricants to stand the gaff, in even the hardest-worked equipment.

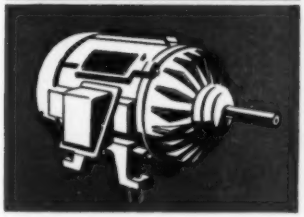
2nd—The alert, substantial Cities Service organization affords you the same complete confidence as these lubricants.

3rd—Cities Service stands ready with competent technical aid, especially capable of ironing out lubrication difficulties.

You can cut time and costs on the job; you can cut lost motion in ordering and delivery, by concentrating responsibility on Cities Service. The line is complete. The quality is always tops.

For further information about our technical aid write CITIES SERVICE OIL COMPANY, Room 27, Sixty Wall Tower, New York City 5. Or call your nearest Cities Service office.





CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

GM DIESEL powers world's most compact 600 cfm Compressor

CONSTRUCTION—"Starts like a charm, even on the coldest morning. No time wasted in getting up to pressure. Runs a heavy pile driver with ease. We can set it out of the way with a crane and move it back to the roadway for towing in no time."

QUARRYING AND MINING—"We couldn't imagine 600 feet coming from such a slick little compressor until we saw the increased drill footage, and the ease with which it took over two FM-2 wagon drills. Good fuel economy, too."

HIGHWAY BUILDING—"Plenty in reserve—full capacity at 6,730 feet altitude. We're operating eight 55-lb. blower drills putting in 20-ft. holes on cliffsides. So easy to maneuver and work with that it's a natural for tough jobs like this."

WINNING acclaim as the world's smallest, lightest, big-capacity portable compressor, the new Ingersoll-Rand Gyro-Flow 600 is powered by a 6-cylinder General Motors Series 71 Diesel engine.

This compact, high-powered portable delivers a full 600 cubic feet of air per minute at a steady 100-lb. pressure, yet it weighs only 9,500 pounds. It is 20 to 40% lighter—and as much as 20% smaller—than other portables of comparable capacity.

Being 2-cycle, GM Diesel engines pack more power in less space. They start quickly on their own fuel, run smoothly and enable equipment to maintain rated performance at high altitudes. They're designed for ease of maintenance—no high-pressure fuel tubing—unit injectors that can be changed in a matter of minutes. And, when needed, low-cost "Factory-Engineered" parts are readily obtainable.

These modern 2-cycle Diesels are bringing new economy and efficiency to more than 500 different kinds of power equipment built by 120 manufacturers. Ask your GM Diesel distributor or write us for full details.

ANSWER THE CALL CIVIL DEFENSE

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

KUE-KEN* ELIMINATES HORSE & BUGGY CRUSHING METHODS

Replace Horse & Buggy Style Blake Type and Overhead Eccentric Type crushers with KUE-KEN . . . the only successful new jaw crusher design in 90 years.

25-50% More Capacity with Kue-Ken

Yes! this is true. Kue-Ken Crushers operate at normal speed of 375 crushing strokes per minute. This is 25-50% faster than any other crusher . . . gives 25-50% more capacity. Higher speed makes finer, more uniform product. Meets states' specifications easier.

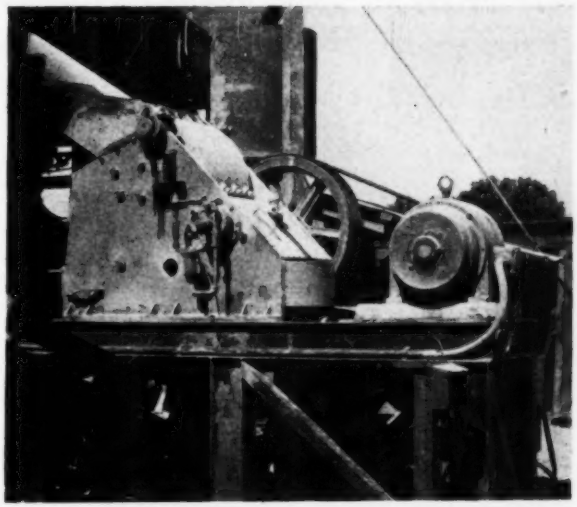
Kue-Ken's exclusive principle of "Crushing without Rubbing" gives 5-10 times longer jaw plate life, more capacity on less power.

Modern Design

Kue-Ken banishes forever the grease cup and oil can. Kue-Ken operates with "crankcase type" sealed-in, filtered oil, pressure lubrication system. Change oil only twice a year. Automatic protection against tramp iron. Safety device instantly releases fly wheel, quickly, easily reset. No breaking or shearing parts.

Let Kue-Ken Work for You

There is no secret to Kue-Ken efficiency. Let us refer you to operators who have changed to Kue-Ken. They never go back to old style crushers.



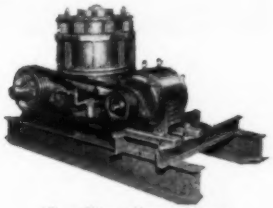
#54 Kue-Ken 24" x 8". Installation is at Turlock Rock Co. Feed is hard 6" river boulders crushed down to 1½" at 30 tons per hour.

Note: Balanced construction eliminates heavy fly wheels and useless dead weight. Only one drive pulley required. No massive foundation needed, yet operating at 375 RPM . . . 25 to 50% faster than other crushers.

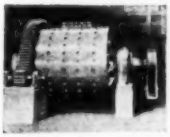
Sizes 12" x 7" to 48" x 60"

Get Complete Facts — Write for Bulletins

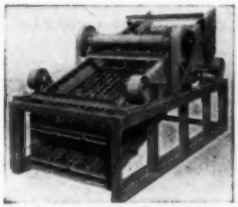
California (Southern)—Migula & Co., Pasadena
Montana—Caird Engineering Works, Helena
Texas—Engineered Sales Co., San Antonio
Utah—Lund Machinery Co., Salt Lake City
Washington—
Seattle, Washington Machinery and Storage Co.
Spokane, Construction Equipment Co.



Kue-Ken Gyracones



Rib-Cone Ball Mills



Overstrom Screens

*Pronounced Que-Ken. U.S. and Foreign Patents Pending.

445 CHESTNUT ST. • OAKLAND 20, CALIFORNIA

STRAUB MFG. CO.

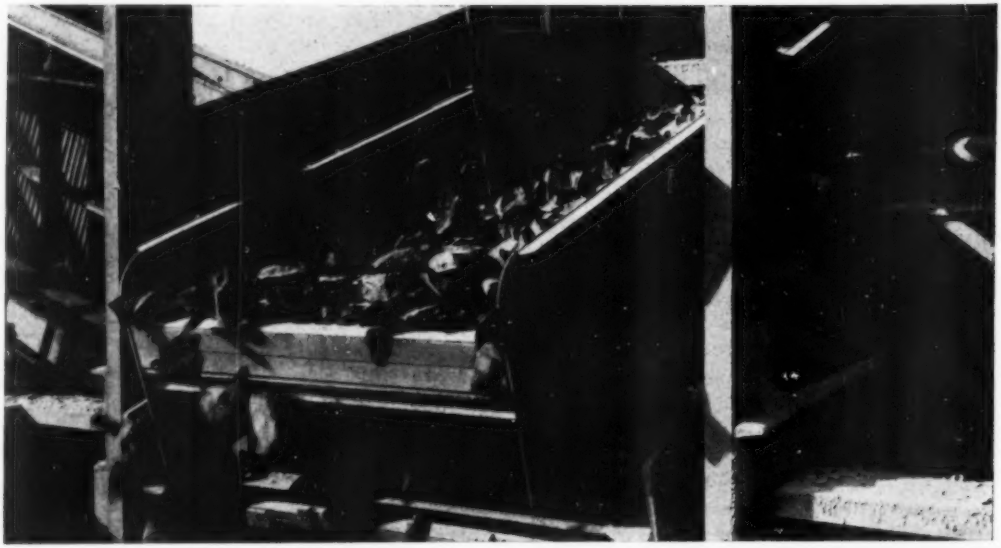
Kue-Ken Balanced Crushers	Rib Cone Ball Mills	Overflow Classifiers
Kue-Ken Simplex Crushers	Concentrating Tables	Feeders
Kue-Ken Gyratory Crushers	Overhead Eccentric Crushers	Screenwheel Classifiers

Pennsylvania Crusher Co., Exclusive Licensed Eastern Manufacturer and Distributor Broad and Arch Streets, Philadelphia, Pennsylvania.

Sir W. G. Armstrong Whitworth & Co. (Ironfounders) Ltd., Authorized Licensed Manufacturer and Distributor Close Works, Gateshead-upon-Tyne, England.

"WHAT A PRODUCER"

Says Harvey N. Clark, Dolomite Products, of this SECO Primary Scalper



Photographed on the job, Gates, New York Dolomite Plant

Dolomite Products has built up a fine reputation for producing accurately sized material, and Seco Vibrating Screens play an important part in this success story. Here's what Mr. Harvey N. Clark of Dolomite Products further says:

"We set up our plant for volume production . . . we don't want to lose a day due to equipment breakdown. That's why through the years we've come to rely on Seco Vibrating Screens *for every screening operation in our plant.* We now have 12 Secos screening everything from ag-lime up."

Back of this and other remarkable performance records of Seco Vibrating Screens is Seco's patented Equalizer Assembly . . . which makes possible a fully controlled, true circular action . . . for greater accuracy . . . large tonnages . . . and smooth, *long*-life operation. Get the whole Seco story . . . Send for Catalog No. 203 today!

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

WHAT'S AHEAD?

Check your screen requirements now.

PLAY SAFE! REPLACE OR ENLARGE WITH

Performance Proven

SECO VIBRATING SCREENS

Made only by

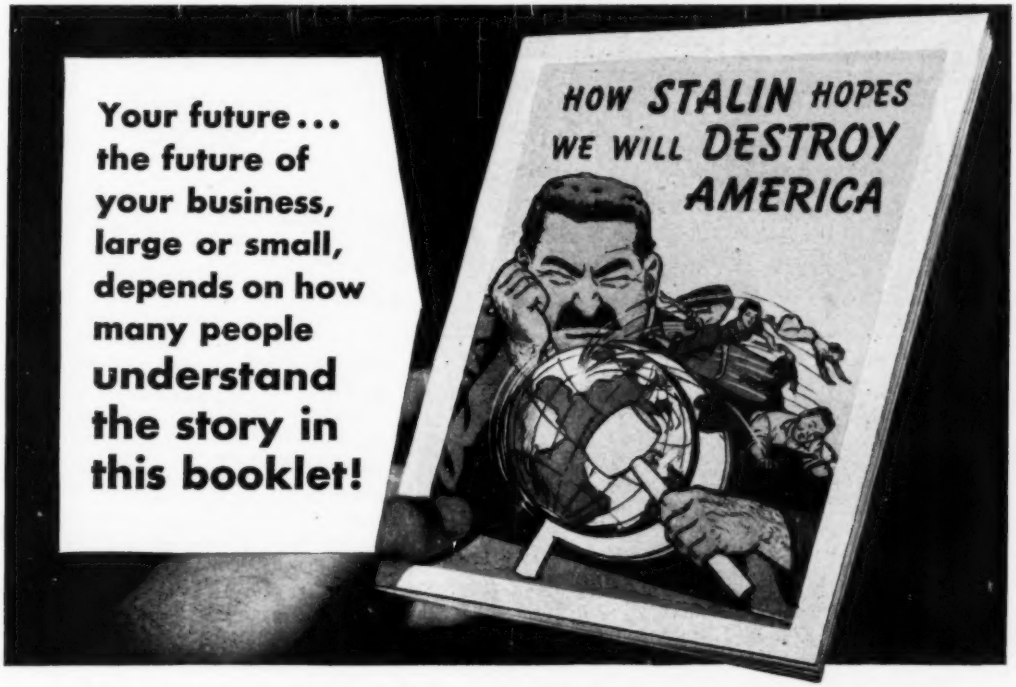
SCREEN EQUIPMENT CO., INC

1750 WALDEN AVENUE

BUFFALO 25, NEW YORK

In Canada—United Steel Corp., Toronto, Ontario

There IS something YOU can do ABOUT INFLATION!


Your future... the future of your business, large or small, depends on how many people understand the story in this booklet!
HOW STALIN HOPES WE WILL DESTROY AMERICA

Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its ***causes*** *and* ***cures****. Then we will have gone a long way toward eliminating this pending catastrophe.*

ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it"...."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it"..."In picture form it impresses you more. Most people don't read about it"..."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

BEMIS BRO. BAG CO.
St. Louis 2, Missouri

FOR EVERY BUSINESS, LARGE OR SMALL: In quantities, it costs only a few cents a copy—$10.00 for 100 copies, down to 3 cents per copy in larger quantities. Single copy free. For full information, write PICTORIAL MEDIA, INC., Attention: Paul Wheeler, 205 E. 42nd ST., NEW YORK 17, N.Y.

LIMA

CAPACITIES
CRANES-Up to 110 TONS
SHOVELS-¾ Yds. to 6 Yds.
DRAGLINES-Variable

LIMA Rubber Mounted TRUCK CRANES in 20 and 35 Tons Capacity

LIMA rubber-mounted cranes offer you the added benefits of greater mobility, less travel time and better maneuverability. Rotating assemblies have the same basic features as corresponding crawler machines, with alterations adapting them to truck or wheel mounting. With outriggers supported, they provide extra capacity; are ideal for operations requiring constant movement around the job, for small scattered jobs, or remotely located.

FIRST BY COMPARISON

LIMA Shovels, Cranes and Draglines have always stood alone by comparison because they are engineered and built to give every user the best value for his investment. Their high productivity, versatility and money-saving features keep down-time to a minimum and output at a maximum.

Investigate LIMA shovels, cranes and draglines. See for yourself how they help you get greater production at lower cost. *Baldwin-Lima-Hamilton Corporation, Lima-Hamilton Division, Lima, Ohio, U. S. A.*

BALDWIN BLH LIMA-HAMILTON

T2101

SALES AGENTS IN PRINCIPAL CITIES OF THE WORLD

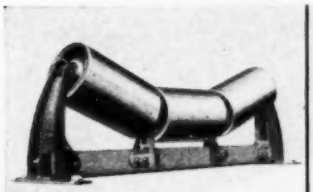
BALDWIN-LIMA-HAMILTON

LINK-BELT engineering experience...

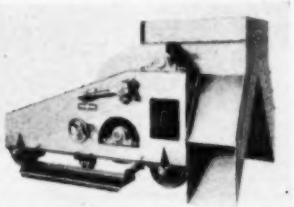
Plus

LINK-BELT quality components...

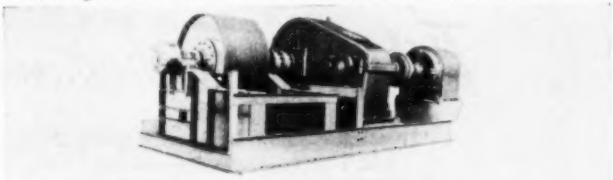
Partial view of extensive Link-Belt belt conveyor system for efficient handling of large volumes of gravel at gravel preparation plant.



Series 100 Idlers are superior quality, with high-grade roller bearings and effective grease-in-dirt-out seal.



Link-Belt makes all types of trippers for discharging materials and distributing them along the conveyor belt.



Link-Belt power transmission equipment meets every conveyor need. Shown here: Link-Belt 300 H.P. fluid coupling drive and D-250 herringbone gear reducer.

...add up to your best buy in BELT CONVEYORS

YES, you get *both*—practical engineering and quality components—when you call on Link-Belt for belt conveyors! Thousands agree Link-Belt makes the finest belt conveyors on the market today.

Engineering experience? Our conveyor specialists draw on an accumulation of years of materials handling and power transmission experience. They will help you and your consultants get top performance from a modern conveying system.

Quality components? We design every item on a belt conveyor system and build it to the highest standards. We make all types and sizes of idlers, take-ups, pulleys, trippers, bearings, drives and supports. You get the *right* equipment for your exact requirements when you rely on Link-Belt.

See for yourself! Let us show you some of the modern conveying systems we have installed. See the results of practical Link-Belt engineering experience—simplicity of design, the finest components, and most important, *top performance.*

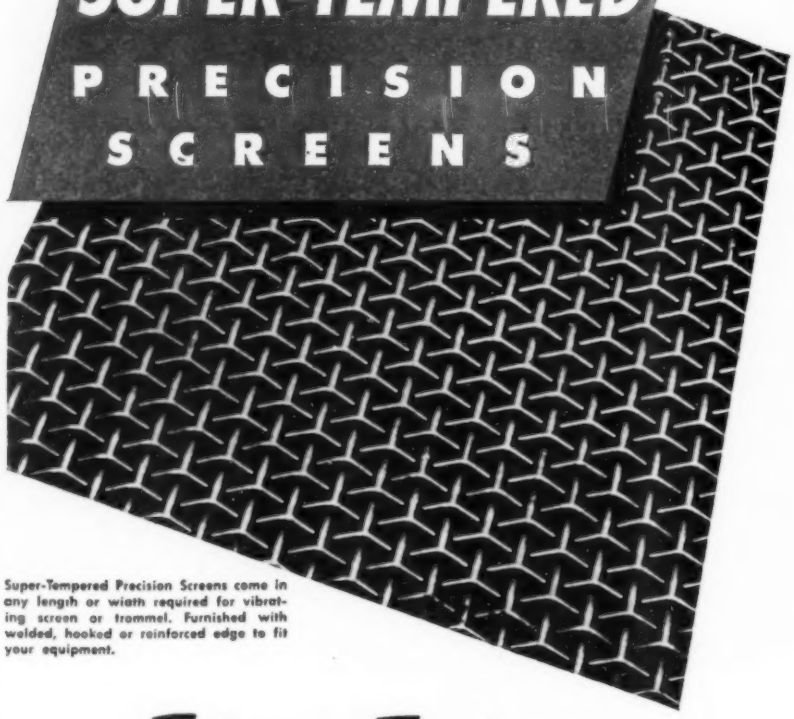
Remember, there's a Link-Belt conveying specialist in the branch office near you. Call him for complete engineering information.

LINK-BELT

BELT CONVEYOR EQUIPMENT 12.501

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

SUPER-TEMPERED
PRECISION SCREENS



Super-Tempered Precision Screens come in any length or width required for vibrating screen or trommel. Furnished with welded, hooked or reinforced edge to fit your equipment.

Tighter AND *Tougher*... FOR GREATER TONNAGE

TIGHTER . . . because Super-Tempered Precision Screens are woven on powerful hydraulic looms of our own exclusive design. These special machines weave the rods together so tightly they can't loosen up under the most severe vibration.

TOUGHER . . . because Super-Tempered Precision Screens are made of super-tempered steel, rolled and heat treated in our own plants for maximum resistance to abrasion and fatigue.

All of which means that Super-Tempered Precision Screens give you longer, more accurate and dependable service . . . handle greater tonnage at lower cost.

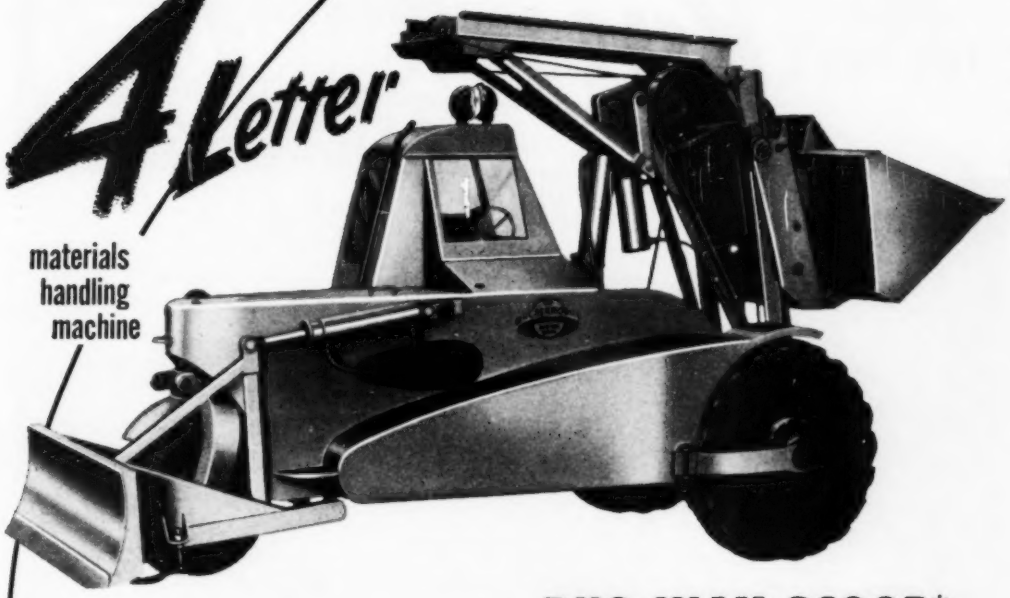
SUPER-TEMPERED PRECISION SCREENS CF&I

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

Sales Office & Plant — 56 Sterling Street, Clinton, Mass. • Branch Offices in key cities everywhere

4 Letter

materials handling machine



. . . DUO-WAY SCOOP*

Here's a single machine that handles four jobs with ease and speed. It's a truck, a tractor, a loader and a dozer. It's a heavy-duty machine for general materials handling and a tractor to pull compaction rollers or water tanks. The Duo-Way Scoop is economical to operate, tough enough for the roughest kind of service, fully dependable . . . and it's equipped with SKF Bearings in the planetaries of both front wheels of the scoop. Other locations use SKF Single Row Deep-Groove Ball Bearings. Once again, SKF has helped put the right bearing in the right place, demonstrated ability to supply bearings engineered and manufactured to turn in consistently reliable, fully dependable performance. 7248

*For details on the Duo-Way Scoop, write Mixermobile Manufacturers, 8027 N. E. Killingsworth Street, Box 7527, Portland 20, Oregon.

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity
craftsmanship
metallurgy
tolerance control
surface finish
product uniformity
engineering service
field service

SKF
BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., Phila. 32, Pa.
manufacturers of
SKF *and* HESS-BRIGHT *bearings*

YOU CAN'T *KILL* THE LORAIN 820

YOU CAN'T *KILL* THE ENGINE

You can't stall the engine under any digging conditions. You can "slam-bang" it out with the toughest rock and be sure digging power will "hang-on" relentlessly until the most unyielding rock is in the dipper. A Lorain-820 will "murder" rock!

YOU CAN'T *KILL* THE MECHANISM

Shock and stresses and impacts of heavy rock digging just can't be transferred into mechanism and cables. They "disappear like magic" with the cushion-like action of the Hydraulic Coupling. No "shear pin" safety devices are needed.

YOU CAN'T *KILL* THE OPERATOR

The operator doesn't fight rock with constant declutching (either manual or automatic)... he opens the engine wide and lets the "never-say-die" power crowd the dipper full. "820's" are smooth, steady, with all the "feel" of the old "steamers".

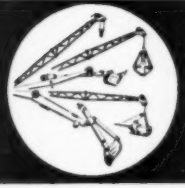
At the Arkansas Limestone Co., Batesville, Arkansas, a big, powerful 2-yard Lorain-820 shovel "murders" heavy rock. Your local Thew-Lorain Distributor has full facts for your job needs.

THE THEW SHOVEL CO., LORAIN, OHIO

IN THE *TOUGHEST ROCK*

THEW **LORAIN**®

on CRAWLER or RUBBER



SHOVELS
CRANES
DRAGLINES
CLAMSHELLS
HOES

ADOLPH ULMER, Jr.
Beaver Dam, Wisconsin

"I truck 8 tons of sand for less than 4½¢ a mile!"

Ulmer says, "On tough jobs my F-7 Ford Truck with POWER PILOT is economical, and I also get all the power I need."

Ulmer was one of 5,000 owners who entered the nationwide Ford Truck Economy Run. He kept daily running cost records on his 1950 Ford F-7 Dump and reports: "My truck traveled 18,955 miles in rough going with an average load of 16,000 lbs. My running cost expense amounted to $825.30 for gas, oil, maintenance and repairs—that's a running cost of only 4.35 cents a mile!"

Like others who rely on Ford for low running costs, Ulmer is sold on the periodic, money-saving service he got from his local Ford Dealer. For more facts on the trucks that last longer *and* save you money every mile—mail the coupon below.

This new 145-h.p. Ford F-8 Big Job with special dump trailer has power reserves that construction men really appreciate! Tractor-trailer gross combination weight rating is 39,000 lbs.

FORD TRUCKING COSTS LESS

because FORD TRUCKS LAST LONGER!

Using latest registration data on 7,318,000 trucks, life insurance experts prove Ford Trucks last longer!

POWER PILOT helps CONSTRUCTION MEN hold down hauling costs

The Ford Truck POWER PILOT is a simpler, fully-proven way of getting the most power from the least gas.

• It automatically meters and fires the right amount of gas, at precisely the right instant, to match constantly changing speed, load and power requirements.

Unlike conventional systems, the Power Pilot uses one control instead of two, yet is designed to synchronize firing twice as accurately.

You can use regular gas . . . you get no-knock performance. Only Ford in the low-price field gives you Power Pilot Economy!

MAIL THIS COUPON TODAY!

FORD Division of FORD MOTOR COMPANY
3253 Schaefer Rd., Dearborn, Mich.

Send me without charge or obligation, detail specifications on Ford Trucks for 1951.

Full Line ☐ **Heavy Duty Models** ☐
Light Models ☐ **Extra Heavy Duty Models** ☐

Name _____
(Please print plainly)
Address _____
City _____ Zone ____ State ____

Barber-

BUCKET LOADER...

MODEL 543

SAVES man power-truck time-money

LOADS all free-flowing materials at 3 yrds. per minute

Cost studies prove that nothing can compete with a Bucket Loader in lowest cost loading from stock piles to trucks.

The B-G constant flow principle virtually eliminates the human element — guarantees the same hourly production all day long, whether the operator is fresh or tired out.

The new Barber-Greene Model 543 is the last word in loading economy. Backed by over a billion cubic yards handled by its predecessors, this machine is ready to cut your loading costs.

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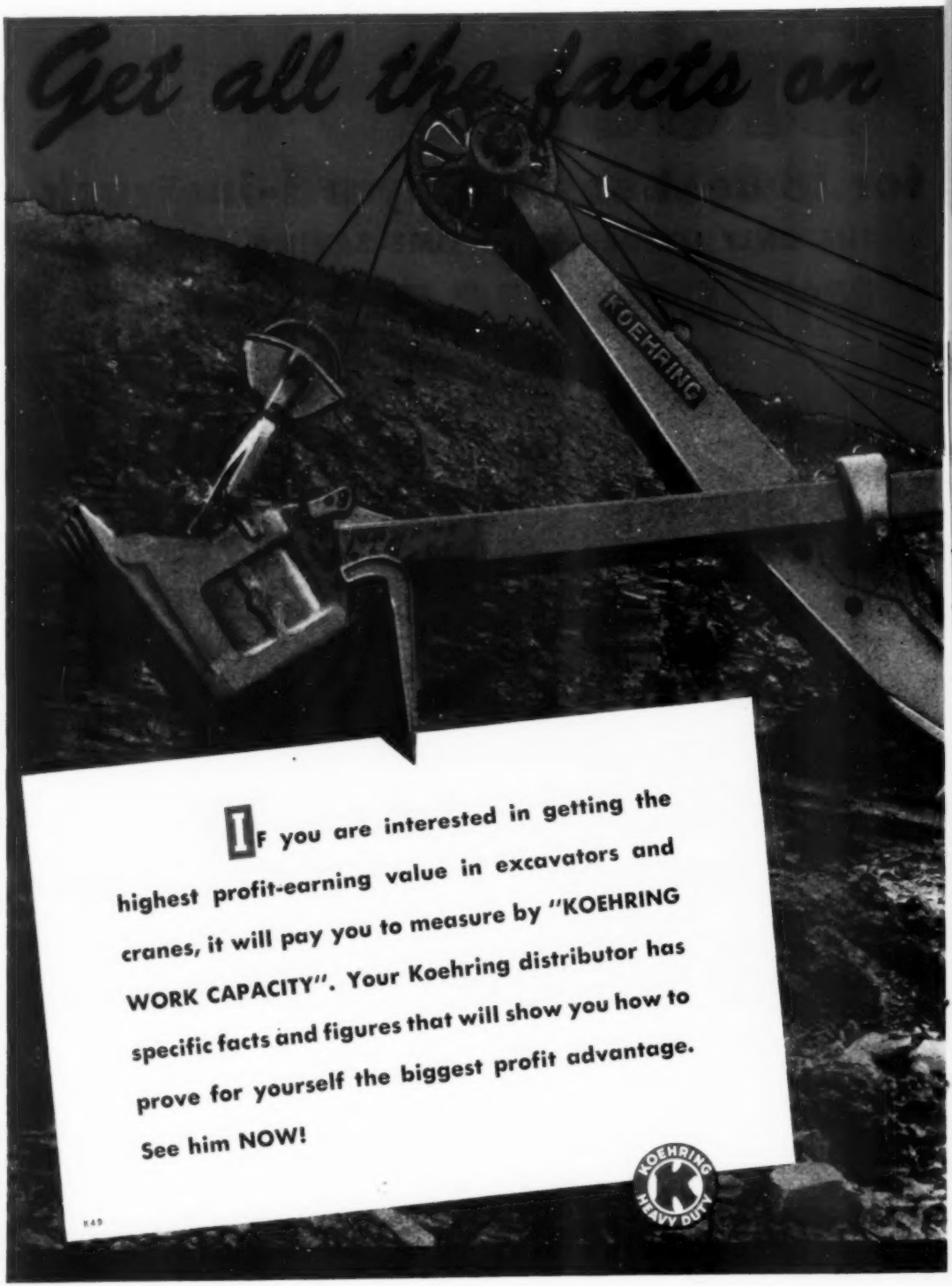
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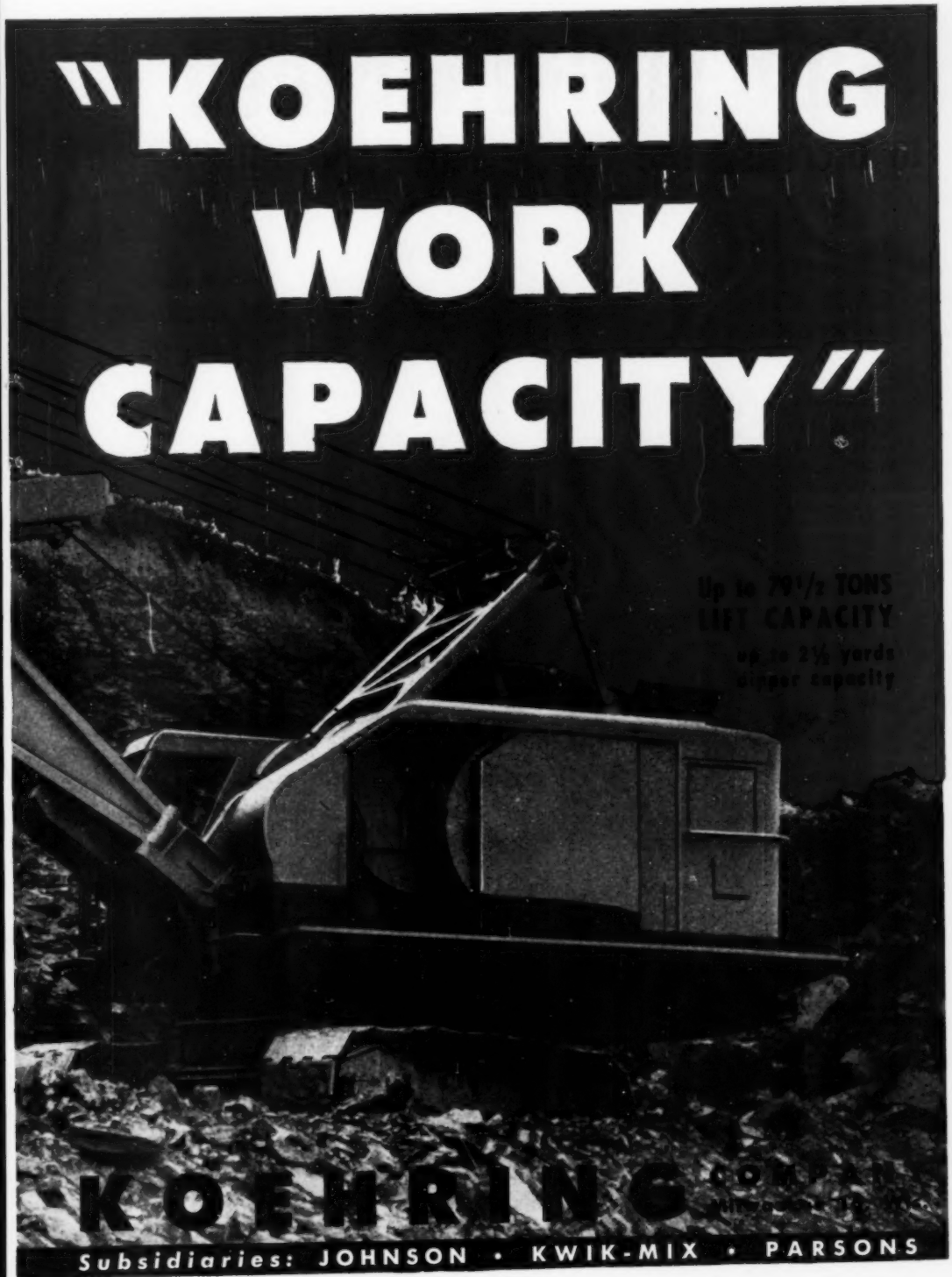
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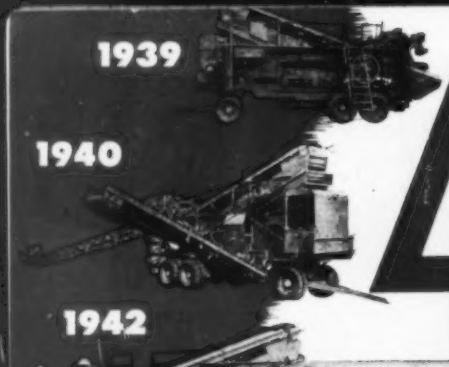

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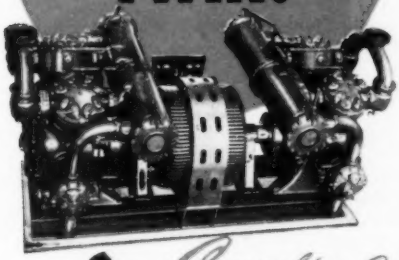

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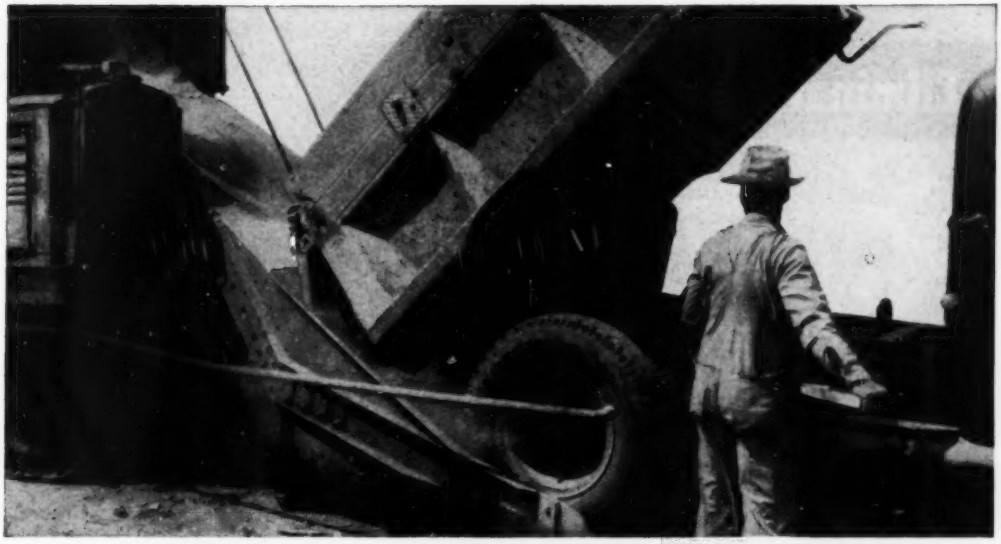

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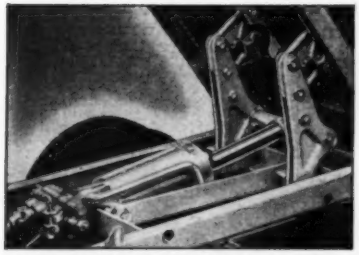

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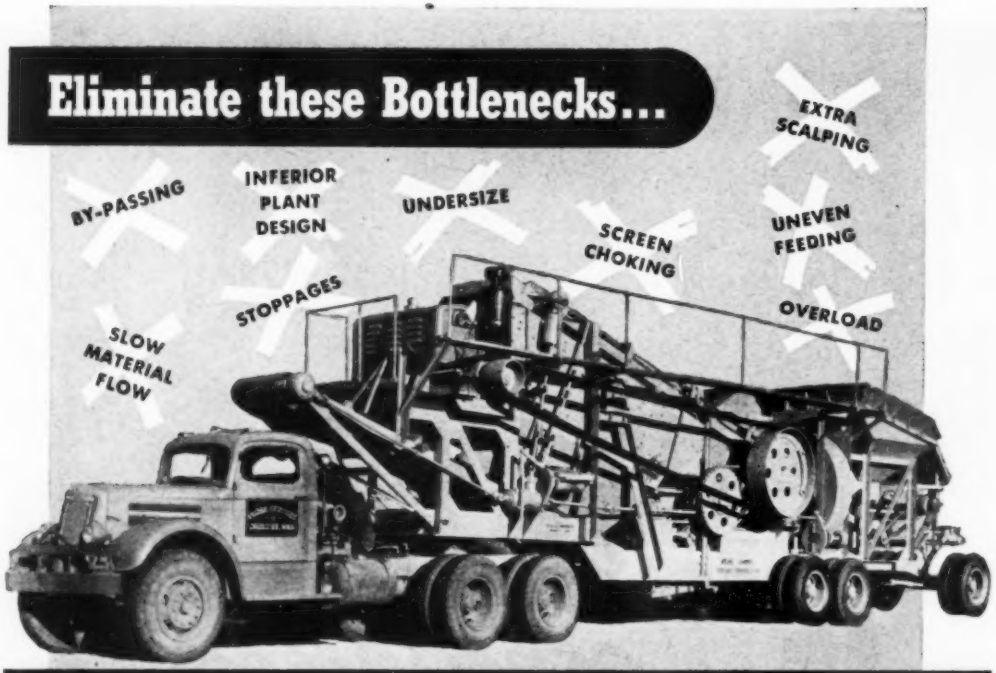

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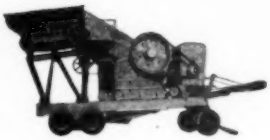

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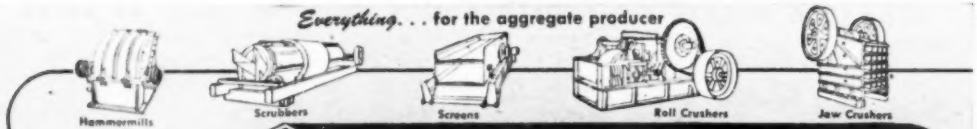

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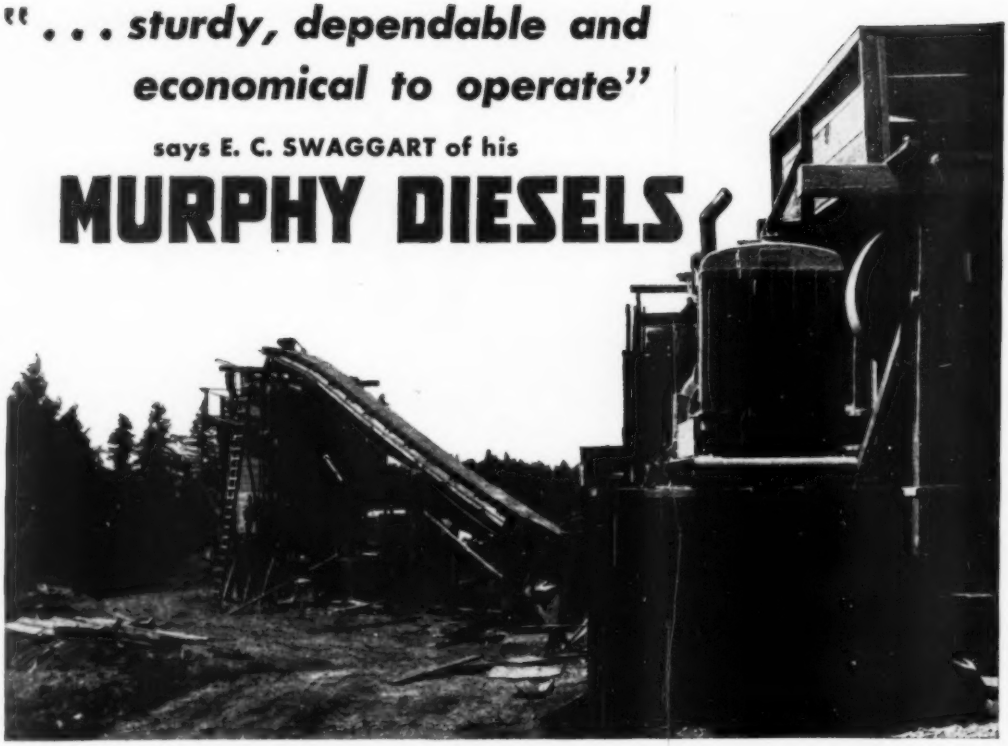

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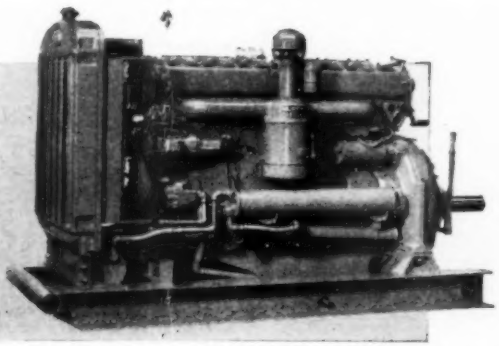

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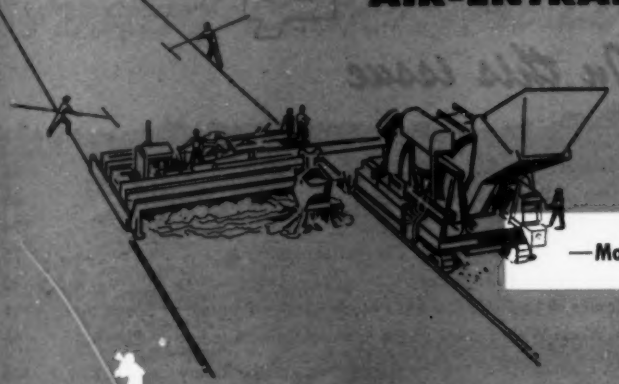

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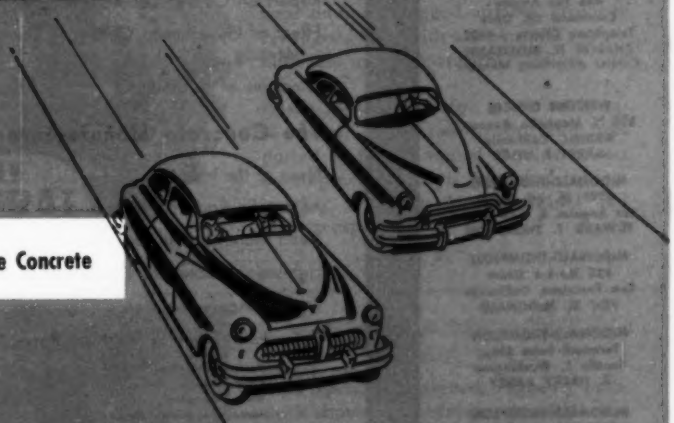

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Vol. 44 JULY 1951 No. 1

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PIT AND QUARRY

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editorial

Improved Safety Records

AN ADVANCE report from the National Safety Council shows that again in 1950 American workers were much safer than in the preceding year. Industrial injury rates for the year showed a substantial reduction in both frequency and severity. Twenty-nine of the 40 basic industry classifications reduced their frequency rates and 23 reduced their severity rates. The 1950 accident frequency rate for all industries, based on the number of disabling injuries per 1,000,000 man-hours, was 9.3—a drop of 8 percent from the 1949 rate. The 1950 accident severity rate for all industries, based on the number of days lost per 1,000 man-hours, was 0.94—a reduction of 8 percent from the 1949 rate.

As a whole the 1950 safety picture in the nonmetallic minerals industries was a very encouraging one, with substantial improvement shown in nearly every category. The cement industry again had by far the best record in this field, with an accident frequency rate of 4.83 and a severity rate of 1.89. These were reductions of 7 and 14 percent, respectively, from the 1949 figures. This excellent record, however, was not up to the improvement in all industries and only enabled the cement industry to retain sixth place in frequency and 34th place in severity among the 40 industries listed.

THE quarry industry had a bad year in 1949, when there was a slight drop in frequency but a sharp increase in severity. In 1950 the situation was reversed, with a slight increase in frequency but a very sharp drop in severity. The accident frequency rate in 1950 was up 5 percent to 18.23, far above the 1946 low of 14.70. The severity rate was down 50 percent to 2.99, far below the 1946 figure of 2.51. As a result of these records the quarry industry moved down from 32nd into 33rd position in frequency and up from 37th into 36th place in the severity column. This leaves considerable room for improvement.

Mining, other than coal, in 1950 again improved its record in both categories but retained its lowly 38th place among the 40 classifications. The frequency rate in 1950 was 25.83—23 percent under 1949 and only about half the 1947 high of 50.53. The severity rate in 1950 was 3.25—down 30 percent from 1949. The mining category consists chiefly of metal mines but also includes many of the industrial or so-called miscellaneous nonmetallic minerals industries. Many of these are very small operations.

IT CAN be said for the nonmetallic minerals industries as a whole that they are far more hazardous by their nature than all but a very few of the other 40 industry classifications. These industries deserve to be congratulated on the improvement shown in 1950, which indicates that serious safety efforts are being made and that they are showing results. That their safety records can be improved considerably, however, is obvious.

It is apparent that safety efforts in the quarry and mining industries must be intensified in order to bring their accident frequency rates down near the average for all industries, which seems a reasonable goal. Their averages—18.23 and 25.83, respectively—compare very unfavorably with the 9.30 average for all industries and the 4.83 figure for the cement industry. It is also obvious that all of the nonmetallic minerals industries—cement, quarry and mining—can bring their severity rates much closer to the .94 average for all industries.

Safety-mindedness in an industry usually begins at the top, among the largest and most progressive companies. Most such companies are now doing a good safety job and participate in the safety contests of their industries or industry associations; so it seems that an industry must depend largely, for any important improvement in its record, on the smaller companies, most of which have spasmodic and poorly-organized safety programs or none at all. Most small companies are not members of an industry association or, if members, do not participate in its safety contest. These small plants have the highest accident frequency rates, according to the records.

OBVIOUSLY safety-mindedness in a company must begin at the top, at the management level. It is the duty of management to adopt safety methods, to engage in safety practices, to take safety precautions, to hold safety meetings, to enter into industry and other safety contests, and to do everything else possible to insure the safety, comfort, and well-being of its employees. It has been often pointed out that safety is not merely a humanitarian objective; it is also good business, as every accident is like a breakdown of an important piece of machinery in that it decreases output and increases production costs. A safe, clean plant and comfortable working conditions also improve the morale of the worker and increase his output and the quality of his work. What is not often mentioned is that unions and government agencies must also be considered since they are becoming more and more interested in safety and working conditions. Producers in general can be sure that if they do not take adequate steps to improve safety in their operations they may soon be forced to do so.

ALL businesses, large and small, have employee relations problems, and it has been found that sincere accident-prevention efforts improve employee relations. This has a direct influence on workers' morale; it reduces labor turnover and also improves public good will. The losses caused by accidents are only partly covered by workmen's compensation insurance, and these insurance rates are also based on accident experience.

According to the National Safety Council, it is not necessary for a company interested in safety to form a special department or to hire a safety expert. Any business which is staffed to operate efficiently has personnel capable of dealing with most accident causes if attention is directed to the problem. Among the agencies which often give special assistance are insurance carriers and their associations, state and federal departments of labor, trade, industry, and professional associations, the National Safety Council, and local councils.

Walter E. Trauffer

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PIT AND QUARRY

Penn-Dixie's Expansion Program at Kingsport Nearing Completion

The Pennsylvania-Dixie Cement Corporation has nearly completed the multi-million dollar improvement and expansion program under way at its Kingsport, Tenn., plant. This plant, built in 1911, was the first major industry in that city, which has since been built up around it. The program includes the installation of a 12- by 500-ft. F. L. Smidth rotary kiln which will replace six old 8- by 125-ft. kilns, together with Multiclone and Cottrell stack dust collectors and a new concrete stack.

The plant is being converted from the dry to the wet process with the necessary alterations and additions in the raw-grinding department, including two new Allis-Chalmers ball mills. New cement storage silos have also been built. The new layout has been carefully planned to permit continuous operation of the plant during the present installation and to conform to a long-range program of complete plant rehabilitation.

Georgia Concern to Initiate Major Modernization Plan

According to an announcement released by W. B. Elcock, president of the Southern States Portland Cement Company at Rockmart, Ga., the firm will launch a modernization program which will greatly increase the plant's output. Cost of the project will be between $4,000,000 and $5,000,000.

Southern States owns approximately 900 acres of land containing extensive deposits of limestone, shale, silica, and iron ore. In addition to 750,000 bbl. of cement and 100,000 bbl. of masonry cement annually, the plant also produces a large quantity of crushed stone.

Foreign Minerals Producers Given Access to Priority Aid

As announced by the Office of International Trade, a procedure has been set up under which foreign minerals producers may make formal application for priority assistance in obtaining American equipment, machinery, and operating supplies. The procedure duplicates the one previously established by the Defense Minerals Administration for domestic minerals producers.

Under the terms of the arrangement, a foreign producer must file a form, MF-100, which assigns to him a serial number on a government register, to be used in processing future application for specific forms of assistance available under the Defense Production Act.

Forms are to be filed with OIT by foreign mining, nonferrous smelting, and mineral processing firms in so-called OIT countries—that is, all those except Canada, ECA-participating countries, and those in which ECA has programs. Canadian applicants will file through the Canadian Division of the National Production Authority. Those in ECA countries will file with ECA.

At Weiser, Idaho, the new mine of the Northwest Gypsum Company recently went into operation as the firm's officials held open house for visitors. Fred Still, general manager, Henry Schindmiller, president, and Arthur Stueckle, vice-president, were present. An output of 500 tons of crushed materail per day is anticipated.

Coming Events

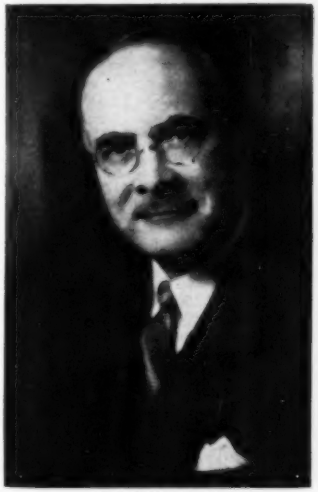
October 8-12, 1951 — Chicago. 39th National Safety Congress and Exposition. Stevens, Palmer House, Congress, Morrison, and LaSalle Hotels.

October 17-19, 1951—White Sulphur Springs, W. Va. Fall meeting. National Industrial Sand Association. The Greenbrier.

November 26-27, 1951—Chicago. Convention of National Association of Silo Manufacturers. Palmer House.

Death Ends Long Service Of Paul C. Van Zandt, Famed Cement Engineer

Paul C. Van Zandt, 73, internationally known as a cement engineer, died on May 26 at his home in River Forest, Ill. Associated with the Allis-Chalmers Manufacturing Co. for many years before



Paul C. Van Zandt

World War I, Mr. Van Zandt traveled extensively in Europe and the Orient.

In 1918 he became chief engineer of the Asano Cement Company, with headquarters in Tokyo, and remained at this post until 1923. He was credited with being one of the founders of Japan's cement industry, which is now that nation's second largest industry. He helped construct cement plants in many parts of the Orient.

After his return to the United States Mr. Van Zandt was named chief engineer for the Ideal Cement Company at Denver. In 1931 he became vice-president of the Universal Atlas Cement Company, with headquarters in Chicago. He retired from active service about six years ago. Pit and Quarry staff members feel that through his death the cement industry has lost one of its most valued members.

Joy Manufacturing Co. Ends First 100 Years, Anticipates Fine Future

One hundred years of technological progress in machinery manufacturing for the mine and quarry industries was celebrated in April, 1951, by the Joy Manufacturing Co. of Pittsburgh, Pa.

Since the company began producing special equipment for use in the marble quarries of Vermont nearly a century ago, Joy has developed and continually improved its line of air compressors, rotary drills, and rock drills for the mining and quarrying industries. The latest development to be exhibited by this progressive concern is the Joy Champion blast-hole drill, which combines a fast rotary drill with a modern air-compressor.

To signalize the beginning of its second century, the company has, as reported in the May issue of PIT AND QUARRY, started the construction of a research center near Pittsburgh. At this proving ground, with its non-commercial mine nearby, Joy engineers and representatives of mining and industrial companies will be enabled to collaborate in screening, testing, and refining new inventions and improvements.

The company has grown to its present stature through the merger of the Sullivan Machinery Co., the La Del Conveyor and Manufacturing Co., and the Mines Equipment Co., and started its second hundred years with eight manufacturing plants in this country, and manufacturing facilities in Canada, Scotland, France, South Africa, and Australia. These wholly-owned foreign subsidiaries, manufacturing machines in accordance with Joy shop drawings and engineering specifications, provide the basis for a world-wide business in mining machinery offering interchangeability of parts except where differences in electrical standards require some variance from American manufacture.

At the opening of this its second century, the Joy Manufacturing Co. personnel looks forward to an increasing degree of collaboration with scientists and engineers and to an ever-widening growth of the company's operations.

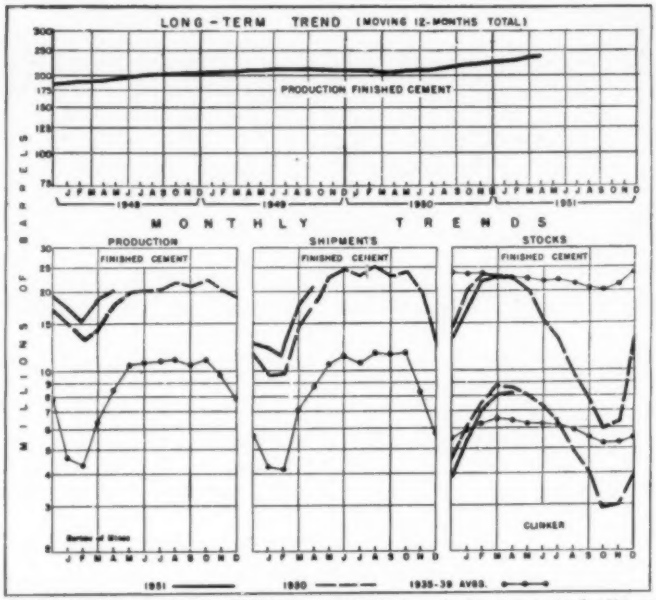
Arizona Plans $23,000,000 Expenditure on Highways

Earl Rogge, chairman of Arizona's State Highway Commission, has announced that nearly $23,000,000 will be available for highway construction in that state in the 1951-52 fiscal year.

Of this total, about $11,000,000 is new money, $6,105,000 of which will be spent for primary state highway system construction, and $2,272,000 reserved for state secondary routes. The remainder is scheduled for urban routes and non-federal aid highways.

100% Water Filling Increases Life of Mine Car Tires

Substantial increases in tire life and lowered operating costs for tires are the result of 100 percent water filling of tires operated at speeds below 5 m.p.h. in underground mines.



SUMMARY—The output of 20,184,000 barrels of finished portland cement in April, 1951, as reported to the U. S. Bureau of Mines, was 11 percent greater than that reported for April, 1950. Mill shipments, totaling 20,953,000 barrels, showed a 14 percent increase over shipments in April, 1950, while stocks of 22,370,000 barrels as of April 30 were 2 percent below the total of a year ago. Clinker production during April reached 20,420,000 barrels, 13 percent over that of April, 1950.

PRODUCTION—151 plants located in 36 states and Puerto Rico produced 20,184,000 barrels of finished portland cement during the month, as compared to the production of 18,134,000 barrels by 149 plants in April, 1950. As indicated above, clinker production was up 13 percent over the same month in 1950.

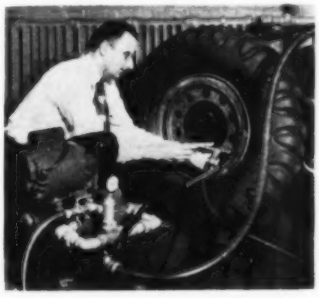
SHIPMENTS—Mill shipments increased 14 percent over the total reported for April, 1950. As compared to shipments in April, 1950, 16 districts recorded gains and 3 districts showed lower figures. The maximum loss was in Kansas and the maximum gain in Puerto Rico at percentages of 20 and 92, respectively. Appreciable gains were noted in Michigan and in the Oregon-Washington district.

STOCKS—Mill stocks totaled 22,370,000 barrels at the end of April—2 percent below last year's month-end figure. Stocks of clinker totaled 8,149,000 barrels, approximately 6 percent less than on the same date last year.

Tests conducted by the Goodyear Tire and Rubber Company, Akron, O., show that the water filling method results in constant pressure through prevention of seepage; decreased rolling resistance; less bounce because of the dampening effect of the water; and elimination of dust hazard from blowouts.

Savings are realized through the labor released from daily checking of inflation pressure; reduced tire failures and resulting equipment tie-ups; elimination of underground inflation equipment; and longer battery service between recharging as a result of decreased rolling resistance.

Inflation is accomplished with a special high-pressure positive-displacement pump with connections for tire valves.



• Filling a tire with water with a high-pressure pump.

Basic Refractories Begins Operating Magnesia Plant

Basic Refractories, Inc., has announced that its $2,250,000 plant at Gabbs, Nev., the first new granular magnesia refractories plant to come into production since the start of the national emergency, has begun quantity output of a new company product, basic magnesite.

The plant, located on the site of one of the largest deposits of magnesite known in this country, is equipped with a 400-ft., 450-ton kiln designed to produce 100,000 tons of refractory clinker a year. This output is enough to satisfy the hearth maintenance needs of furnaces having a capacity of 50,000,000 tons of steel a year, half the country's present capacity.

International Harvester Joins Conservation Plan To Implement Truck Saving

International Harvester Company motor truck retail branches and dealers, who reportedly comprise the largest truck service organization in the world, will participate in a nation-wide truck conservation program beginning July 1.

Free-of-Charge inspection service for the nearly 1,000,000 International trucks now plying the nation's highways will be offered for a 90-day period by the organization's 5,000 sales and service outlets as the first step in the complete International truck saving plan.

W. C. Schumacher, general manager of International's motor truck division, pointed out that the total U. S. fleet has increased from 5,100,000 vehicles in 1941 to 8,500,000 in 1950. He stated that this fleet traveled 55,000,000,000 miles in 1941, whereas the 1950 fleet traveled more than 80,000,000,000 miles, transporting farm products, raw materials, semi-finished and finished goods, and rendering other indispensable services.

The program is based on the company's truck conservation knowledge gained during World War II, and is designed to meet the needs of the one-truck owner, or to supplement the facilities of the fleet owner who has his own service shop. Truck operators are urged to take full advantage of the truck conservation program as offered at International branches and dealerships throughout the country and designated as "Truck Saving Stations".

Direct benefits of the Truck Saving Plan to truck operators are listed as (1) better truck performance over a longer truck life; (2) reduced maintenance and down time costs; (3) protection of truck value; and (4) fewer delays in obtaining new parts.

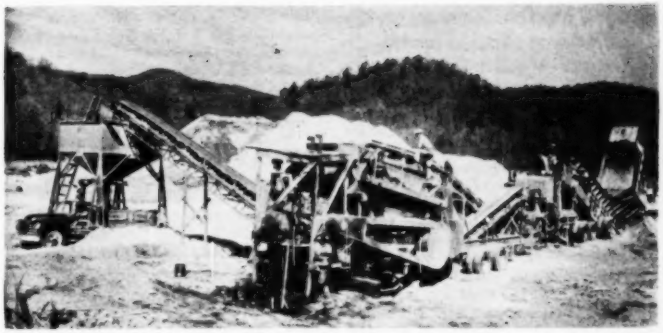
Calaveras to Issue Stock To Finance Expansion Program

Calaveras Cement Company officials recently filed a registration statement with the Securities and Exchange Commission covering 118,066 shares of common stock, par value $5 per share. When the registration statement becomes effective, such shares will be offered to the stockholders on the basis of one new share for each two shares held at a subscription price of $10 a share. Underwriters will purchase unsubscribed shares.

Proceeds will be utilized to finance a plant expansion program estimated to cost approximately $2,250,000.

Correction

We regret that in an item announcing the election of officers of the Bessemer Limestone and Cement Company which was published on page 98 of our May issue the name of George G. Treat, re-elected president, was inadvertently omitted. Mr. Treat has been with the firm for many years, having recently observed the golden anniversary of his association with Bessemer.



• These portable rock crushers operated by Aggregates Producers, Inc., of Charlotte, N. C., are moved from one location to another without removing the engines from the rig. Primary unit of the rig is a 24- by 36-in. Pioneer 151 PLR jaw crusher; the secondary unit is a Pioneer 40-in. triple roll crusher. Both are powered by GM diesels. According to L. G. Hendrix, superintendent and plant manager, an estimated saving of $300 and two days' time results from the elimination of engine removing and remounting during a change of location.

Lone Star Cement Corporation Buys Tract at Baton Rouge

According to word from the Baton Rouge, La., press, the Lone Star Cement Corporation recently purchased a 21.33-acre tract along the Mississippi River near the city. The purchase price was reported to have been $21,330.

H. A. Sawyer, vice-president of the corporation (Louisiana Division), declined to state the firm's plans for developing the property.

Johns-Manville Corp. Expands Research, Mining, Milling

At the annual stockholders meeting of the Johns-Manville Corporation, L. M. Cassidy, chairman of the board, announced that the company is expanding its research facilities and its operations for mining and milling asbestos. He reported that production of asbestos fiber at the company's principal mine at Asbestos, Que., had been increased considerably and that exploration work at the new Munro asbestos mine in northern Ontario was being pursued to determine whether additional ores are available.

Mr. Cassidy stated that a new research building now under construction near Manville, N. J., would provide room for general projects important to national defense, including the development of substitutes for critical materials, jet aircraft blanket insulation, and improved fireproof clothing.

Cover Picture....

The cover photo this month is an aerial view of the newest cement plant in the United States, that of the Lone Star Cement Corporation at Lone Star, Va., which is described in detail in this issue. This 4,000-bbl. dry process plant went into operation in May and the first cement was shipped recently. It has many features, among them the use of 340-ft. dry kilns without waste heat, separate cement storage silos for bulk loading, etc.

1,000,000-Ton Rock Blast Staged at Granite Canyon

Approximately 500,000 cu. yds. of granite—nearly a million tons—were blasted by 240,000 lbs. of T.N.T. on June 3 at the Granite Canyon ballast plant of the Morrison-Knudson Company, eighteen miles west of Cheyenne, Wyo.

The charge was set off along a 3,000-ft. face of the quarry, providing a spectacular show for a large crowd of spectators and considerable aggregate for crushing down to railroad gravel ballast.

Missouri Crushed Rock Plant Hit by $10,000 Fire

Equipment valued at more than $10,000 was destroyed by fire at the Byer Crushed Rock Company's plant near Kansas City, Mo., on June 8. Fire officials from nearby Hickman Mills answered the alarm, but arrived too late to save the burning building. The fire apparently started during an electrical power shortage caused by heavy rains in the vicinity.

According to the Federal Statistical Office, considerable gains were made by the West German building materials industry during March. Cement production during that month amounted to about 985,000 tons, an increase of 220,000 tons over the February output and 475,000 tons above the production total for March, 1950.

May Construction Activity Down from April Figure, Up for 5-Month Period

Total expenditures in this country for new construction amounted to $2,500,000,000 during May, 1951, as jointly reported by the Building Materials Division, U. S. Department of Commerce, and the U. S. Labor Department's Bureau of Labor Statistics. A drop from April in new homebuilding expenditures, the first May downturn on record (since 1939), prevented total new construction outlays from rising seasonally to the extent usual at this time of the year. The relatively small advance in May (6 percent) resulted from substantial increases in defense plant and military construction and seasonal expansion of most types of nonresidential building and heavy construction work.

The decline in residential building activity reflects the drop in new housing started during the winter and the further downturn in April. The total value of new private residential buildings put in place amounted to $854,000,000 3 percent less than in April, and 18 percent less than in May, 1950. This decline in homebuilding held total private expenditures for new construction at about the same level as a year ago, in spite of substantial increases over the year in commercial, industrial, public utility, and most other types of nonresidential building.

Public construction outlays amounting to $813,000,000 in May were 17 percent above April and 39 percent above May, 1950. Atomic energy and other defense plants, military facilities, and highway work accounted for most of the increase.

During the first 5 months of 1951, new construction with a total value of $11,149,000,000 was put in place, as compared with $9,400,000,000 in the corresponding period of 1950—a 19 percent increase. Total private outlays of $8,085,000,000 were 15 percent above the corresponding period a year ago; public expenditures of $3,064,000,000 were up 30 percent.

Ohio Stone Producer Gets Two-Way Radio License

J. M. Hamilton & Sons, who operate a crushed limestone and crushed stone quarry near Marion, O., have been granted a common-carrier license by the FCC for the operation and maintenance of their own radio station.

The base station, KQA815, is located in the plant office. There are four mobile stations currently in operation, and two more will be added soon.

The base station, with a range of about 40 miles, is a product of Motorola. Of the four mobile stations installed in four of their trucks, three are Motorola units, and one is a GE.

Mr. Hamilton pointed out that only licensed operators can operate the base station located in the plant. Anybody can operate the mobile stations in the trucks. He further explained that he and three others of his organization are licensed operators. As theirs is a common-carrier license, they have the advantage of renting their services when they choose. Presently the trucks equipped with mobile units haul and deliver stone products from the plant.

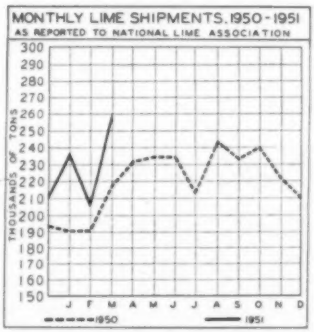
Insofar as J. M. Hamilton & Sons are contract haulers in addition to their quarry operations, Mr. Hamilton says that the advantages of the installation of this equipment are better service and delivery and economy time. He added that 75 percent of their haulage is contract haulage, and with the advantage of these mobile units, he and his men are always in close contact with the office. The license is in the name of J. M. Hamilton & Sons. A. M. Hamilton and O. E. Hamilton are partners in this quarry and haulage operation.

California Bentonite Firm To Operate Three Mills

A new bentonite deposit estimated to contain 20,000,000 tons is being developed about 30 miles west of Mendota, Calif., in San Benito County.

E. B. Smith, Dr. Felix Smith, Richard Eachus, and John Poggi, developers of the deposit, have purchassed three 100-ton-per-day mills and are installing the first of these at South Dos Palos. The mineral will be mined in an open-pit operation by power shovel and trucked to the mill.

A bill which would have levied a 50-cent per ton tax on raw phosphate mined in Florida was killed on April 25 by the finance and taxation committee of the state senate.



According to data collected by the National Lime Association, 46 companies in March, 1951, shipped 259,632 tons of lime (163,493 quicklime; 96,139 hydrate). Reporting companies represent 58.8 percent of the association members' total capacity of record. Based on Pit and Quarry's estimate for the remainder of the industry, the total shipments were approximately 485,700 tons. Shipments by uses and grades for March, 1951, were

	Quicklime	Hydrate
Agricultural	3,909	19,313
Building	19,799	46,469
Chemical	139,785	30,357
Totals	163,493	96,139

Ideal's Baton Rouge Plant, Slated to Open Next Year, Aims at 4,500 Bbl. Per Day

According to a report in the *Ideal Cement Mixer*, house organ of the Ideal Cement Company, the firm's plant in Baton Rouge, La., recently purchased from the government, is scheduled to go into partial production immediately. Ideal bought the surplus property facilities in 1950 and has been reconditioning equipment (intended for aluminum production) for the manufacture of cement. When the plant is in full production, capacity is expected to reach 4,500 bbl. per day. Completion of reconversion is scheduled for the spring of 1952.

Equipment currently being installed includes a finish mill, cement silos, and a packhouse. One interesting piece of equipment is a hammerhead crane for unloading barges. This piece of machinery replaces portable clamshell cranes.

Because of high and low Mississippi River water levels at various seasons, work on the water front involves providing for mooring barges at different levels. (Much of the raw material will be brought in by barge, and cement made at Baton Rouge will also go to New Orleans via the water route.)

It is estimated that $3,500,000 to $4,000,000 will have been poured into the remodeling and reconditioning of the plant in addition to the purchase price before the work is finished. In charge as plant manager at Baton Rouge is D. E. Koch, formerly manager of construction at the New Orleans terminal. Guy Friday, formerly of the Portland, Colo., plant, is assistant to Mr. Koch.

Two Eastern Firms Observe Anniversaries—25th and 30th

Twin anniversary festivities were recently held in Atlantic City to mark the 30th birthday of the New Jersey Silica Sand Company and the 25th birthday of the National Pulverizing Company. At the gala luncheon C. R. Wolf, president of both companies, served as host and master of ceremonies. He gave the history of both organizations and paid tribute to the founders and executives. Each employee with a 20-year service record received a $100 savings bond.

Other officers of the New Jersey Silica Sand Company are M. M. Wolf, vice-president; and C. Franklin Wolf, secretary. Heading the National Pulverizing Company, in addition to C. R. Wolf, are A. S. Bivins, vice-president; L. D. Corson, secretary-treasurer; and H. E. Nichols, superintendent. (C. R. Wolf is also treasurer of the former concern and general manager of the latter.)

Stockholders of the Riverside Cement Company have approved the change of company shares from no par to par value stock. The action placed a $25 par value on the A stock and a $1 par value on the B stock. The amendment to the articles of incorporation will become effective in the near future.

Walter H. Acheson Named Head of Price Controls For Masonry Materials

Walter H. Acheson, formerly of the Somers-Barr Co., Inc., Urbana, Ill., ready-mix producers, was recently appointed administrator of price controls for the Masonry Materials Division, Office of Price Stabilization.

In his new post Mr. Acheson is responsible for price control of portland cement, lime, sand and gravel, crushed stone, slag, ready-mixed concrete, and concrete products. During World War II he also had similar duties. Mr. Acheson is a member of the National Ready Mixed Concrete Association's board of directors. His present headquarters are in Washington.

El Salvador Cement Firm Gets Import-Export Exemption

At San Salvador a contract was signed recently between the Ministry of Finance and Cemento de El Salvador, S.A., governing the new plant now under construction near Acajutla on the Pacific Coast.

By the terms of the agreement the firm, first of its kind in El Salvador, is assured of freedom from import duties on machinery and fuel, and of export duty on the cement it produces. In return it must give priority to the government on sales up to 50 percent of output. The company has been given a two-year maximum period in which to begin producing cement. Officials stated that they expect to begin turning out cement the latter part of this year.

German Fluorspar Companies Form National Association

According to an announcement made recently by Louis J. Lipton, vice-president of Continental Ore Corporation of New York City, German Fluorspar mining companies have joined to form the Verein Deutscher Flusspatgruben (Association of German Fluorspar Mines) at Munich. Mr. Lipton stated that F. Gross, manager of the group, and E. Grueter, general manager of the Vereinigte Flusspatgruben, G.m.b.H., Stulln, Bavaria, have arrived from Germany to promote the fluorspar trade.

Germany is one of the major fluorspar producing countries of Europe; and West Germany produces approximately 150,000 tons annually.

The Hercules Cement Corp., Philadelphia, Pa., has been given stockholder approval to increase its authorized capital stock from 60,000 to 180,000 shares. The approval clears the way for the splitting of shares on a three-for-one basis.

Liberty Limestone Corp. Expands Grinding Facilities, Doubles Former Capacity

The Liberty Limestone Corporation, Buchanan, Va., recently enlarged its magnesian limestone crushing and grinding plant at that location, making it one of the largest grinding operations in existence. A Raymond 73-in. roller mill was installed which increased by about 55 percent the capacity of ground products, formerly about 1,500 tons daily. This mill supplements the existing four Raymond 54-in. mills and three rod mills. Products include agricultural limestone, rock dust, fillers, feed lime, etc. In addition, 1,000 tons of crushed stone is produced daily.

The company has another plant at Rocky Point, 8 miles east of Buchanan, also on the James River, which makes high-calcium limestone products. It produces 1,000 tons of crushed and flux stone per day and has one Raymond mill with a capacity of 200 tons daily.

Lone Star Cement Corporation's 32nd annual report shows on its attractive cover the sections of the Western Hemisphere served by the firm, which has plants in the eastern, central, and southern parts of the United States, in Cuba, and in three South American countries—17 in all. Total output of all these plants (per year) was 31,300,000 bbl.

• This aerial view, taken May 18, 1951, of construction progress on the new 1,000,000-bbl. cement plant being built at Brandon, Miss., by the Marquette Cement Manufacturing Company shows that all concrete structures have been completed and that the erection of steel frameworks is about to get under way. Marquette officials state that machinery and equipment are arriving at the site on schedule and that no difficulties are foreseen in getting the plant into production by September of this year.

World-Wide Shortage Of Sulphur Expected To Last Two Years

Soaring demands for sulphur to meet the expanding industrial and mobilization needs have resulted in a world-wide sulphur shortage estimated at 1,000,000 tons for 1951. Required in the manufacture of explosives, newsprint, fertilizers, rayon, rubber, and aviation gasoline, the much sought yellow mineral is expected to be in short supply for at least two years.

The sulphur stockpiles in the United States, which normally are equivalent to two years' supply, dropped to a precarious six-months' supply last fall, all of this in the hands of private industry. In Canada, which imports over half her sulphur from this country, industry is preparing to spend $11,000,000 in capital investments to explore the possibilities of increased production from smelting gases, natural gases, and iron pyrites. Italy is taking measures to boost sulphur production in the Sicilian mines about 150 percent during the next three years in an effort to fulfill about half of Western Europe's consumption.

Even Russia is being hampered by a lack of sulphur, as evident through her eagerness to purchase foreign sulphur. Although the soviet nation has made significant purchases in Italy, the available information indicates that an acute shortage is hampering her industrial production and threatening sharp limitations upon potential munitions output in the event of war.

A 10-nation committee representing Australia, Belgium, Brazil, Canada, France, Italy, New Zealand, South Africa, the United Kingdom, and the United States recently gave the global sulphur shortage some serious study and tentatively decided to allocate the scarce mineral in an effort to halt the international scramble for existing supplies. Although details of the allocation plan are secret, available supplies will be divided among countries of the Western world, but withheld from Russian-dominated areas.

A large part of the world shortage is due to other countries becoming overdependent upon the low-cost, high-purity sulphur of the United States, and their inability to convert quickly to other sulphur-bearing materials. The build-up of this dependency is shown in the gradual rise of U. S. sulphur exports from some 300,000 tons in 1935 to 1,200,000 tons in 1949.

Another big factor in the present shortage has been and still is the tremendous wastage, due to the relatively low cost of brimstone, and to the fact that it has been cheaper to buy new sulphur than to conserve or reclaim supplies.

Effective June 1, the U. S. Government put into effect an allocation plan for sulphur in 11 West Coast states. For in spite of the fact that sulphur output in this country reached a high of 12,050,000 short tons in 1950, as compared with 8,687,000 short tons in 1945, sulphur remains very short in the West. Allocation there will be determined according to essentiality of end use, with manufacturers of aviation gasoline getting high priority. The program for allocation will be extended to the East, according to officials of the Office of International Trade, as conditions require.

Various American companies, urged on by the government, have launched plans for developing additional sulphur sources, including higher-cost sources previously neglected. Freeport Sulphur, for instance, is preparing for explorations in the marsh-covered dome at Bay Ste. Elaine, La., by way of drilling rigs mounted on barges. Texas Gulf Sulphur is developing a dome at Spindletop, near Beaumont, Tex., and through an affiliate is planning development work at concessions in Mexico. Jefferson Lake is completing a sulphur-mining plant at Starks dome in Louisiana. Dow Chemical Co. is increasing its output of ethanolamine, a chemical used in obtaining sulphur from natural gas.

A number of other companies are planning to obtain sulphur from such sources as exploitation of the hydrogen sulphide content of natural gases and refinery gases, pyrites and pyrrhotite, surface sulphur deposits, gypsum, and improved recovery of now discarded waste acid.

New development work now under way or projected, supply conservation, and the tapping of new supply sources indicate that an adequate supply of sulphur and sulphuric acid should be available within two years. However, in view of projected industrial expansion in the United States under the defense program, domestic demands for sulphur are expected to continue in a strong uptrend, with the increase by 1960 estimated at about 84 percent above present levels.

A bill introduced in the Florida legislature on April 9 would require all persons, firms, or corporations engaged in mining any mineral or subterranean product to provide necessary places for waste deposits. The bill was sponsored by Representative Chambers of Hardee.

• Vice-president of Marquette Cement Manufacturing Co., D. S. Colburn (at left) presents the company's inter-plant bowling championship trophy to members of the Nashville plant's team: (left to right) Cecil Moore, Gene Smith, Creighton Miller, William Cunningham, team captain Jesse King, and Leland Davis.

Leader of Coxey's Army And Silica Sand Producer Dies at Age of 97 Years

On May 18 the colorful career of "General" Jacob S. Coxey, of "Coxey's Army" fame, ended in Massillon, O., when the 97-year-old exponent of money reform died in that city. He had spent more than two-thirds of his life battling for a losing cause—printing press money which the government could use without paying interest to banks.

In 1894 "Coxey's Army" set out from Massillon on a 35-day march to Washington. Its object was to persuade Congress to use the easy-money method for a road-building project which would ease the hardship brought on by the panic of 1893. He hoped that many thousands would join the original 50, but at no time did the "army" number more than 500. Police dispersed the ragged caravan in Washington, and the leader was jailed and fined. General Coxey was nominated for president twice by the Farmer-Labor Party.

Less widely known than the story of the "army" is the fact that General Coxey was also a pioneer silica sand producer. He founded the Industrial Silica Corporation, Youngstown, O., which is now headed by his son, J. S. Coxey. This firm operates three plants in Ohio and one in Pennsylvania.

Northwest Gypsum Company Holds Open House at New Mine

Open house was held at the Northwest Gypsum Company's new mine near Weiser, Idaho, recently, to give visitors an opportunity to view the equipment. The mill is expected to turn out 500 tons of crushed material per day.

Officials of Northwest Gypsum include Henry Schindmiller, president; Arthur Stueckle, vice-president; and Fred Still, general manager.

Another Premature Blast Kills Three Quarry Men

The second premature dynamite explosion in about six months ripped through a quarry near Martinsville, W. Va., on May 15, killing three men and injuring two others. Dead were Fern Lambert of Knoxville, Tenn., one of three brothers who operate the quarry, John Finney of Bassett, W. Va., and Lee Hairston of Martinsville. Injured and hospitalized were Winfred Hairston of Bassett and Lester Hill of Stuart.

Three men were also killed at this quarry last November 1 by another premature dynamite blast.

The use of vermiculite as a snuffer for incendiary bombs and as a spray coating for inside hulls of combat ships was disclosed at a recent stockholders' meeting of Western Mineral Products Co. in Minneapolis, Minn. The coating, a mixture of vermiculite granules and asphalt, was used on 60 percent of the ships built in the San Francisco, Calif., area during World War II.

Operating Ordnance Plants Brings Personnel Shifts In National Gypsum Setup

Changes in personnel announced by National Gypsum company officials since the firm took over the operation of ordnance plants at Parsons, Kan., and Wahoo, Neb. (see PIT AND QUARRY, June, 1951, p. 55), are as follows:

George Cook

George Cook, the new manager at Mobile, who was formerly assistant manager and production superintendent, succeeds Colon Brown, now heading operations at Parsons.

Albert C. Olsen

Albert C. Olsen was transferred from his post of mill superintendent at the Savannah, Ga., plant to succeed Frank C. Crowley, who was for seven years manager at the Portsmouth, N. H., plant and who is now production manager at Parsons.

Robert E. Scifres is the new manager at National City, replacing Keith W. Waugh, who is presently directing operations at the Nebraska ordnance plant. Mr. Scifres was transferred to National City from the New York plant.

Mr. Brown has been at Mobile since 1938 as office manager, assistant works manager, and plant manager. Mr. Crowley, associated with the firm since 1936, worked at the Bluebonnet ordnance plant operated by National during World War II. Mr. Cook was assistant works manager and production superintendent at Mobile

R. E. Scifres

before becoming manager. Mr. Olsen, a National employee for the last 14 years, has been successively quality supervisor, line foreman in the board plant, and mill superintendent at Savannah.

Mr. Waugh has served the company since 1939 in the following posts: plant manager at Saltville, Va., director of production at Bluebonnet, plant manager at Bellefonte, Pa., and manager at National City. Mr. Scifres was an electrical engineer in the Bluebonnet plant during World War II. Since then he was plant engineer, assistant to the plant manager, and assistant board plant superintendent at Mobile. In 1950 he was assigned to the New York plant.

Freeport Sulphur Production Reaches Peak for Quarter

Production at Freeport Sulphur Company's Grande Ecaille mine in Plaquemines Parish, La., reached a record of 326,000 tons during the first quarter of this year, according to company officials. The present production rate, slightly above that of 1950, is almost twice the World War II peak and about three times the prewar level, they stated.

Meanwhile, Freeport continues to allocate sulphur to domestic users. Langbourne M. Williams Jr., president, stated that this program, initiated last January, was necessitated by the government's "set-aside" for Allied nations. Mr. Williams added that the industry's export quota for the quarter ending June 30 was set at 250,000 long tons of crude sulphur. The first quarter allocation of 200,000 tons was boosted to 230,000 tons.

Highway Builders Should Display Unity: Reybold

Lt. Gen. Eugene Reybold, executive vice-president of the American Road Builders' Association, told the Fifth Annual Florida Highway Conference meeting in Gainesville, Fla., that American highways cannot withstand another beating like the one they took in World War II without continuous and extensive rehabilitation.

Warning against any notion of "business as usual", he called on representatives of the highway industry to exhibit a unity of effort and center its attention on those thoroughfares most vitally needed. "Our highways," he said, "are interwoven with the ever-expanding national economy which has characterized our growth as a nation and our assumption of world leadership. Always, in peace or in war, our highways have been a vital part of our country's assembly lines. We cannot pursue the unbusinesslike procedure of expanding our production without simultaneously providing for the speedy and orderly movement of our increased output."

An expansion and construction program aimed at increasing production by 12½ percent is under way at the A. P. Green Fire Brick Co. in Mexico, Mo. According to William S. Lowe, president, certificates of necessity have been issued by the National Security Resources Board, and the program is scheduled for completion in the spring of 1952.

Natl. Gypsum Co. Completing New Medicine Lodge Plant

Nearing completion at Medicine Lodge, Kan., is the National Gypsum Company's multi-million-dollar wallboard plant, a structure which covers 101,000 sq. ft. of floor space, or nearly three acres.

According to M. V. Soldal, project engineer from National Gypsum's home office in Buffalo, N. Y., the plant will produce enough wallboard for 96 new homes every day it is in operation.

More than 3,500 employees of the Minnesota Mining and Manufacturing Company recently were given a $20-per-month cost of living allowance. Those receiving the "extra" are office, technical, and engineering personnel. Production employees previously received wage increases.

Alpha Portland Cement Company officials announced that the firm is building a new cement storage warehouse at its Ironton, O., plant. The $600,000 structure will hold approximately a month's output from the plant, permitting continuous production all year.

Burton A. Ford Named To Important NPA Post In Washington, D. C.

Burton A. Ford, vice-president of the St. Regis Sales Corporation, Allentown, Pa., recently began his new duties as chief of the paper shipping section, Containers Division, NPA. Temporarily, his headquarters are in Room C-104, Old General Accounting Office Building, Washington, D. C.

Considering the importance of the paper bag supply to the nonmetallics industries, it is extremely fortunate that operators in this field have in Washington a representative who is so familiar with their requirements.

Burton A. Ford

National Safety Congress Scheduled for Oct. 8-12

Chicago is again the meeting place of the National Safety Council's annual congress and exposition, its 39th. The dates are October 8 to 12.

Sessions on industrial safety are scheduled for the Stevens, Palmer House, Congress, and Morrison hotels. Traffic safety sessions will be held at the Congress, and those on commercial vehicle and farm safety at the LaSalle. Programs featuring school and home safety will be put on at the Stevens. Additional information on the congress may be obtained by writing to R. L. Forney, general secretary, National Safety Council, 425 N. Michigan Avenue, Chicago 11, Ill.

S. D. Utilities Commission Cuts Sand, Gravel, Stone Rates

A "substantial" reduction in intrastate railroad rates on sand, gravel, and crushed stone has been ordered by the South Dakota State Public Utilities Commission. Since truck shipments had increased under the rates which had been in effect, the commission said that reduced rates would attract more business to the railroads and increase their revenue.

The rate reductions range from about 30 to 50 cents per ton, based on length of haul. C. A. Carr, commission rate expert, stated that the average haul in South Dakota is 80 miles, on which reduction would be 34 cents a ton.

Preventive Maintenance Plan Given by GMC Truck Division

GMC Truck and Coach Division, General Motors Corporation, Pontiac, Mich., has initiated a truck preventive maintenance service to assure truck owners of greater economy and efficiency in the operation of their trucks.

The new preventive service program will be presented in a series of meetings throughout the country. The object is to prevent breakdowns and to assure an adequate supply of parts and service so that equipment may be kept operating without delays.

The system includes a maintenance work record sheet which contains all repair and maintenance data on each truck and which serves to provide a basis for scheduling of regular maintenance work and for locating driver deficiences or unusual operating conditions.

Regular maintenance programs have cut costs as much as 50 percent in some cases, in addition to lowering the cost per mile of operation and forecasting future truck operating expenses, according to company spokesmen.

Diesel Manufacturers Assn. Issue Revised Handbook

The revised 1951-edition of *Standard Practices for Low and Medium Speed Stationary Diesel Engines*, first published in 1935 by the Diesel Engine Manufacturers' Association, is scheduled to come off the press around July 1. Written primarily for consulting engineers, buyers, users and manufacturers of diesel engines and engine parts and accesories, the revised edition contains added sections dealing with dual fuel engines, operation and maintenance, starting systems, and several new topics.

The book will be priced at $5.00 per copy. Orders should be placed through the Diesel Engine Manufacturers Association, One North LaSalle St., Chicago 2, Ill.

The San Francisco Chemical Co. is planning a $250,000 expansion program for several of its plants in Wyoming. The program includes a new shale treatment plant at Leefe and recommissioning its Waterloo railhead with new crushing and pulverizing equipment. The Leefe plant will increase the capacity of the Raymond mill and bring production up to greater efficiency.

The Lone Star Cement Corporation has announced the removal of its Kansas Division offices to 1005 Grand Ave., Kansas City, Mo.

Canada Crushed Stone Merges with 3 Firms To Form New Concern

According to word from R. G. L. Harstone, vice-president and managing director of Canada Crushed Stone Limited, Hamilton, Ontario, a new crushed and cut stone company—Canada Crushed and Cut Stone Limited—has been formed as a consolidation of four firms.

The new organization will own all the assets of Canada Crushed Stone, all shares of Queenston Quarries Limited and National Cut Stone Limited, and 98 percent of the common shares of Ritchie Cut Stone Limited.

Shareholders of Canada Crushed Stone Ltd. confirmed the action of the directors in selling the assets of the company in response to an offer of $1,912,200 submitted by T. R. Harrison, president of Yorkmont Securities Limited. The securities concern also offered to purchase from shareholders any shares offered to it at $30 per share.

Canada Crushed Stone Ltd. was incorporated in 1912 by the late C. M. Doolittle. It operates one of the largest crushed stone plants in Canada and controls Queenston Quarries, largest building stone quarry in Canada. All executives actively serving in the merged companies will continue with the new organization.

Color Film Shows Voter His Role in Budget Balancing

An interesting sound-color slide film, *The Fourth Man*, pointing out the need for economy in our national budget, has been produced, sponsored by Walter Harnischfeger, president of Harnischfeger Corporation, Milwaukee, Wis.

Narrated by radio announcer Andre Baruch, the film explains in simple story fashion the responsibility of business, labor, and agriculture in seeing that the "fourth man", the government, keeps the budget balanced. In developing this theme, the film explores the complicated problem of how costs have skyrocketed, upsetting the budget, and shows how the greatest weapon of business, labor, and agriculture—the vote—can be used to keep the budget in line. The film recently received the Freedoms Foundation Honor Medal Award.

Groups or clubs may borrow this film from the Advertising Department of Harnischfeger Corporation, 4400 West National Ave., Milwaukee 14, Wis., or any Harnischfeger branch office in the United States.

$40,000,000 More Requested For Minerals Exploration

Dr. James Boyd, administrator of the Defense Mineral Administration, recently requested an additional $40,000,000 for the strategic mineral exploration program for the 12 months beginning July 1.

The program, in which the government pays part of the cost of seeking new mineral sources, is getting under way with a $10,000,000 allotment for the next two months.

Lone Star Opens New Plant In Botetourt County, Va., With Inspection Tour

Lone Star Cement Corporation's multi-million-dollar plant in Botetourt County, Va., recently completed and currently being operated for testing and storage purposes, was inspected on May 24 by a party of 150 industrialists and civic leaders. White-capped guides led them to nearly every department of the huge plant and explained each process involved in the manufacture of cement.

Less than one year ago the site was a meadow. Now the big plant, built on the firm's 600-acre tract, is producing cement at the rate of 4,000 bbl. per day, around the year. About 180 persons will be employed. The Botetourt facilities will be duplicated by Lone Star in its plant now under construction at Sweetwater, Tex.

R. A. Hummell, president of the corporation, was present to deliver the address at the luncheon after the formal opening.

Mines Bureau Report Covers Raw Material Programs

Problems of assuring sufficient raw materials for the steel industry, increasing the nation's reserves of nonferrous metals, and making sure of an ample supply of mineral fuels for economic growth and national security bulked large among the programs of the Bureau of Mines last year, according to the annual report released by Secretary of the Interior Oscar L. Chapman.

Major factors shaping the Bureau's activity during the period were the depletion of mineral resources as a result of two great wars, the increasing demands for minerals and mineral fuels as a result of the nation's expanding economy, and the requirements of national security.

Problems in the field of metallic and nonmetallic minerals tackled during the year included the low-cost recovery of lead and zinc from oxidized ores, improved techniques for recovering nonferrous metals from scrap, utilizing the nation's large reserves of silicious bauxite, and producing synthetic mica and synthetic asbestos.

The report cites intensification of the Bureau's study of the air-pollution problem. During the year, the Bureau helped arrange the program and provided the chairman for the First United States Technical Conference on Air Pollution, authorized by the President in December, 1949, and held at Washington in May, 1950.

Invasion of Air Space Costs State Agency $262,950 in Suit

An unusual damage suit won recently by the United States Gypsum Company in Boston, Mass., involved the claim by the firm that air space above its plant at Charlestown had been taken by the Mystic River Bridge Authority. The suit will cost the state of Massachusetts $262,950.

Officials of the gypsum concern charged that erection of the bridge over the plant had reduced the sunlight in the plant, increased noise, lowered property value, and created potential danger of things falling or being dropped. In addition, they stated that the docking of ships at its wharf had been made more difficult because of the presence of a bridge support.

New A.M.A. Research Report Gives Wage Data Sources

Management and labor are placing more reliance on facts and figures in their arguments over wage rates and less on emotional appeals, a new study by the American Management Association indicates. During the past ten years, an enormous body of data bearing on wage rates has been developed, not only by government agencies but by research departments of management and labor organizations.

The study, *Sources of Economic Information for Collective Bargaining*, A.M.A. Research Report No. 17, examines the data now available to negotiators and arbitrators who are seeking a more factual approach to wage setting. It discusses in detail the sources of figures and the nature of the arguments cited by both management and unions in connection with the four criteria most commonly used in the determination of wage rates: the cost of living, productivity, "going" wage rates, and "ability to pay". The book is available from the American Management Association, 330 W. 42nd Street, New York 18, N. Y., at $3.75 per copy.

New Jersey Law Extends Silicosis Compensation

New Jersey's governor, Alfred E. Driscoll, recently signed into law a bill providing compensation for the occupational diseases of silicosis and asbestosis. Effective July 1, the new law covers about 12,000 workers in asbestos and ceramic industries, affording full protection under the Workmen's Compensation Law. Formerly, persons suffering from silicosis and asbestosis, both occupational respiratory diseases, were entitled to compensation only when totally disabled.

United States Potash Company, Carlsbad, N. Mex., reported a net income for 1950 of $3,286,399 equal to $3.13 a share of common stock. Net sales amounted to $12,714,400. The 1949 figures were $2,753,890 or $2.62 a share on sales of $11,175,892.

Agricultural Limestone Institute Holds Mid-Year Directors' Meeting

The mid-year meeting of the board of directors of the Agricultural Limestone Institute was held on June 1, 1951, at the Edgewater Beach Hotel, Chicago. The 18 members present represented five of the six regions, including Canada. During the regular business meeting a change was made in the by-laws so that only one board meeting will be held at the annual convention. The matter of the proposed merger of the A. L. I. and the National Agricultural Limestone Association was discussed at great length. Committees of the two associations had met in Cincinnati on March 22, to discuss the possibility of such a consolidation. It was decided to confer further with N. A. L. A. on this subject after the latter group's meeting on June 13 and 14.

Tentative plans were also announced for the combined annual convention and machinery exposition with the National Crushed Stone Association, to be held at the Stevens Hotel, Chicago, the week of February 18, 1952. Plans now are to telescope this meeting into three days, with separate opening sessions, a joint luncheon on Monday, February 18, and a joint dinner that night. On the morning of Tuesday, February 19, there will be an operating meeting for the two groups, then the Manufacturers' Division and A. L. I. luncheons, followed by separate meetings in the afternoon. On the morning of Wednesday, February 20, there will be a combined general session, followed by two joint affairs, a luncheon and banquet that night. Ample time will be left open for visiting the machinery exhibits. It was also voted to hold the 1952 mid-summer board meeting in Chicago.

In his report, Henry A. Huschke, managing director, told of the gratifying progress being made on percentage depletion for the industry and of the excellent work done by the association's representatives. The ACP appropriation, he said, was approved at $225,000,000 by the House of Representatives, and this represents about the same cut from the original figures as other agricultural appropriations. He also reported the progress of several other legislative developments affecting the industry and told of the recent promotional activities of the association which included a new series of newspaper advertisements. The names of recent new members were also announced, including one in Mexico, the Industrial Calera de Huescalapa s. de. R. L., Guadalajara, Jalisco, Mexico.

J. R. Boyd, secretary-treasurer, gave his report, which indicated that the finances of the association were in good shape. President Phillip E. Heim also reported on a number of matters of current interest, including the formation of an industry advisory committee in conjunction with N. A. L. A. It was also reported that A. L. I. members have been invited to participate in the N. C. S. A. Safety Contest.

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

WHETHER intentionally or not the July, 1921, issue of PIT AND QUARRY was devoted almost entirely to the application of hydraulics to the production of sand and gravel. Some space was also devoted to the lime convention recently held.

The first article, staff written, was a description of the application of hydraulic elevators or water lifters in place of the usual mechanical devices such as bucket elevators, belt conveyors, derricks, etc. This hydraulic elevator consisted of a sluice box connected to a cast-iron elevator ground chamber having in its bottom a metal plate to which the nozzle from the pressure pipe was connected. An upraised pipe carried the water and material to the sluice box, bins, or washers above.

The principle of the apparatus was that the sand- or gravel-laden water entered the elevator ground chamber, either through the sluice box mouth or the suction pipe, or both. A jet of water coming through the pressure pipe and the bottom of the chamber was directed upwards through the throat and pipe line. This jet, passing through the contracted area of the throat, together with the water entering the chamber, created sufficient vacuum to cause a suction at the intake of the elevator, lifting the sand and gravel up the elevator with the water. A gravity flow of water with considerable head was used, and the load was raised about one-fifth of this head. These lifts were made with upraised pipes from 8 to 30 in. in diameter.

A feature article, *Suggestions for the Installation and Operation of Dredging Pumps*, was written for PIT AND QUARRY by Victor J. Mill, an authority on the subject, who was then an engineer for the Morris Machine Works. It was published in answer to many requests for information on this subject. In an easily understandable manner the author outlined the general principles of hydraulic dredging and gave sound advice on the application, installation, and operation of dredge pumps.

Another feature article, *Hydraulic Stripping for Overburden*, by the late Bradley S. Carr, engineer for the American Manganese Steel Co., was presented to satisfy the demand for information on this increasingly popular method of removing overburden. The advantages and limitations of this system for various industries were clearly outlined.

Another staff-written article described the proper method for arranging a pipeline for sluicing. Suggestions were made for handling various materials, particularly sand and gravel.

There was an illustrated description of the operations of the Lake Erie Sand Co. of Sandusky, O., which operated two large sand dredges in Lake Erie. These boats each dredged a 1,400-ton load daily and unloaded it to shore storage yards.

Also prominently featured in this issue was the third annual convention of the National Lime Association, held June 15, 16 and 17, 1931 at the Hotel Astor, New York City. In his report to the convention, which was presented in full, President Charles Warner (The Warner Company) emphasized the vital necessity for cooperation and a balanced viewpoint to carry the industry through the period of uncertainty confronting the lime industry and others. He described in detail the work the association had done to find new and larger markets for lime, and cited what the industry had done to improve its product and adapt it to new uses.

Other subjects and speakers on the 3-day program included: *Kiln Efficiency* by the late Richard K. Meade, Baltimore, Md.; *Chemical Control, the Key to Kiln Efficiency* by W. D. Mount, Lynchburg, Va.; *Fine Art of Lime Burning* by George B. Wood, Rockland & Rockport Lime Corp., Rockland, Maine; *Problems to Be Considered in Changing a Quarry from Hand to Steam Shovel Methods* by Irving Warner, The Warner Company, Philadelphia; *Wet Mixed Lime Mortar—A Chapter of Successful Experience* by W. C. Hay, Blue Diamond Plaster Co., Los Angeles; *The Dependence of Modern Industry on Research* by Arthur D. Little, Cambridge, Mass.; *The Measurement of Plasticity* by Warren E. Emley, Bureau of Standards, Washington, D. C. Many other speakers, including several members of the association's staff, spoke on a wide variety of subjects including standardization, research, financing, social service, architectural uses, sales methods, dealer relations, soil chemistry, plasticity, etc.

Apparently the three days of the meeting were fully occupied with serious matters, but there was some fun in the evenings and the annual banquet was reported to be particularly enjoyable.

Carl F. Clausen Appointed To NPA Building Division

The National Production Authority of the United States Department of Commerce has announced the appointment of Carl F. Clausen as consultant in the building and materials division of NPA's facilities and construction bureau.

Mr. Clausen, who was born in Denmark in 1902, came to America and entered the cement industry in 1928, when he joined F. L. Smidth & Co. of New York, designers and operators of cement manufacturing plants. From 1941 to 1945 he was chief of the nonmetallic materials section, building materials division, War Production Board, serving as government presiding officer of the Portland Cement Industry Advisory Committee, and as administrator of L-179, the limitation order on portland cement.

Carl F. Clausen

After the war Mr. Clausen joined the Pacific Portland Cement Co. as assistant to the president, remaining in that post until he joined the Portland Cement Association as manager of that organization's manufacturing research. He is a member of the American Institute of Mining and Metallurgical Engineers, serving at present on the Cement, Lime, and Gypsum Committee and as chairman of the Research Committee on Grinding in the Cement Industry.

Coast Guard Stops Barges Of Ohio River Sand Company

U. S. Coastguardsmen made an unusual catch the other day at Louisville, Ky., when they stopped two gravel barges as they were about to go over the Ohio River dam. The barges, each loaded with 600 tons of gravel, are owned by the Ohio River Sand Company. They had broken loose from their moorings and were being swept downstream by the current when the Coast Guard went into action. In addition to rescuing the cargo, the men also saved two persons who were on the runaway barges.

Riverside Sand and Gravel Company, Yakima, Wash., is currently engaged in hauling rock for 11 miles of county road. The company has the contract for $136,104 to grade, ballast, and surface the roads with crushed rock.

A change in the name of the Great Lakes Carbon Corporation's building products division to the Perlite Division was announced recently. It was stated that the change had been made because of the expanding market for products utilizing perlite.

N.L.A. Members Return to Homestead For 49th Annual Convention

By WALTER E. TRAUFFER

another ON THE SPOT report

THE 49th Annual Convention of the National Lime Association, which was held May 24, 25 and 26, 1951, at The Homestead, Hot Springs, Va., was another in a long series of successful meetings held at this location. The weather was ideal, the attendance was excellent, and the program, as usual, was timely and varied, covering all subjects of primary interest to lime producers. As usual, there were a number of outstanding speakers on the program both from inside and outside the industry. The subject matter was also well balanced, ranging from association business to research and government action. These conventions offer members the opportunity to discuss their problems of all types with each other and with the various speakers, who always include a few government officials. Also as usual most of the members attending brought their wives, and the entertainment and social angles of the meeting were given due attention. Total attendance was 113, with 46 ladies present, the latter setting a new record.

President's Report In his opening address President Wallace E. Wing briefly analyzed the world situation and the economic developments in this country affecting the lime industry and industry in general. He said that the growing number and complexity of problems confronting a producer have reached a point where it is impossible for him to analyze them all and conduct his business intelligently without outside help. Such help, he said, is being provided by the association through its staff and through the various committees appointed to investigate and act on the most important of these problems. He also emphasized the importance of the research work being done by or through the association to point out new markets and to improve the products being made.

Staff Reports In his annual report to the membership Robert S. Boynton, general manager, reviewed developments affecting the lime industry since the start of the Korean conflict. He said that the government is learning that trade associations such as N.L.A. are fertile and dependable sources of valuable information on industries important to our re-armament program and is coming to regard them as the voices of their industries. He briefly described some of the services performed by N.L.A. for the lime industry and the country.

With respect to industry controls, Mr. Boynton advised producers to expect the worst, stating that we are just entering the major phase of the war materials production program. Percentage depletion, he said, is again a very definite possibility and the progress made to date is very encouraging. He also commented briefly on price control, a subject which was to have been covered in open forum by Walter Acheson, chief, Masonry Section, Building Materials Branch of the Office of Price Stabilization, but who was unable to be present.

Mr. Boynton commented on the lack of knowledge about lime on the part of the public and government and told what the association is doing to disseminate such knowledge. He mentioned some of the literature which it has published recently, particularly the booklet *Chemical Lime Facts*, which describes the use of lime for many chemical purposes. This publication is very timely as chemical industries now have top priority for everything they need. In closing Mr. Boynton summarized the progress of research work being done at agricultural experiment stations and engineering colleges.

• Mrs. E. I. Williams (Riverton Lime and Stone Co.) and Robert S. Boynton (National Lime Association).

Re-election Of Officers All officers of the association were re-elected to serve a second year. They are: Wallace E. Wing, president (Marblehead Lime Co.); Miss Helen McNamara, treasurer (Eagle Rock Lime Co.); Robert S. Boynton, general manager; and Miss Gladys L. McBee, secretary.

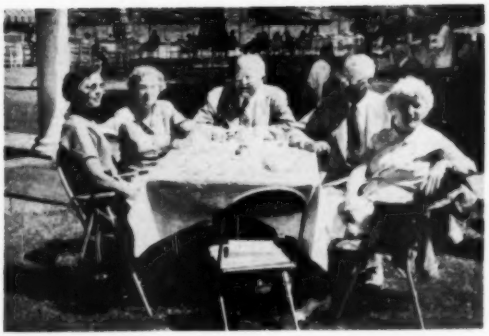
Directors The board of directors for the coming year is composed of the following: District 1—C. C. Loomis, New England Lime Company. District 2—E. D. Williams, H. E. Millard Lime and Stone Company; Bolton L. Corson, G. & W. H. Corson, Inc.; and J. P. Feiser, LeGore Lime Co. District 3—Amos B. Miner, National Gypsum Company; F. J. Collins, The Kelley Island Lime & Transport Co.; and Reed C. Bye, Warner Company. District 4—J. A. Dunaway, Peery Lime Company. District 5A—Fred Witmer, The Ohio Hydrate & Supply Co. District 5B—Charles E. Rarey, The Marble Cliff Quarries Co. District 6—L. N. Carmouche, The Dow Chemical Co. District 7—Robert F. Mathews, Mississippi Lime Co.; and Wallace E. Wing, Marblehead Lime Co. District 8—Michael Brisch, Rockwell Lime Co. District 9—Henry LaLiberte, Cutler-Magner Co. Districts 10 and 11—K. L. Hammond, Keystone Lime Works, Inc. District 12—Paul Sunderland, Ash Grove Lime & Portland Cement Co. District 13—G. E. Robinson, Austin White Lime Co. District 14—Adda M. McMillin, Roche Harbor Lime & Cement Co. District 15—Ralph S. Locke, Diamond Springs Lime Co.

Safety Awards Twelve lime plants which operated during the last year without a lost-time injury won awards in the 1950 lime plant safety competition. The plants winning Certificates of Honor are as follows:

Group A1—quarry and calcining plants working 100,000 or more man hours: Galloway plant of Ash Grove Lime & Portland Cement Co.

Group A2—quarry and calcining plants working less than 100,000 man hours: Thomasville plant of J. E. Baker Co.; Lee plant of Lee Lime Corporation; McCoy plant of

• In this photo are (left to right): Mrs. Irving Crown (Marblehead Lime Co.); Mrs. K. L. Hammond (Keystone Lime Works, Inc.); Mrs. Wallace E. Wing (Marblehead Lime Co.); K. L. Hammond; Mrs. Lester Crown (Marblehead Lime Co.); Lester Crown; Wallace E. Wing; Irving Crown.



• Left to right: Mrs. W. J. Ash and Mrs. David Follett (New England Lime Co.); Irving Warner (Warner Company); David Follett; Mrs. Irving Warner.

the Warner Company; Ripplemead plant of Ripplemead Lime Co.; Frederick plant of Shank & Etzler Lime Co.; Evans plant of United States Gypsum Co.

Group B—underground mine and calcining plants: Kimballton plant of National Gypsum Co.; Kimballton plant of Standard Lime & Stone Co.

Group C—lime calcining plants without associated quarry or mine: Ludington plant of the Dow Chemical Co.; Houston plant of Nyotex Chemicals, Inc.; Plymouth Meeting plant of Phillip Carey Mfg. Co.

These 12 plants constitute the third-largest group of winners for any year in the 16-year history of the lime safety contest, but the safety record established for 1950 is by no means enviable. A glance at the records of 40 plants reporting monthly accident statistics to N.L.A. reveals that there were two fatalities, two permanent partial disabilities, and 178 temporary disabling injuries during the last year, involving a total of 19,000 lost days. The frequency rate for the 40 plants was 23.9 accidents per 1,000,000 man-hours—an increase of 16 percent over the corresponding industry figure for 1949.

Objective of Management In his discussion of *The Objective of Management*, Dr. Robert T. Haslam, formerly vice-president in charge of research for the Standard Oil Company of New Jersey, included a large amount of sound advice which applies not only to the lime industry but to most other industries as well. Dr. Haslam expressed his pleasure at attending another lime convention, his first in 25 years. He explained that in the early 1920's he was on the staff of the Massachusetts Institute of Technology. N.L.A. during that period started its first fellowship research there, on which he did much of the work.

According to Dr. Haslam, the chief objective of management should be the continuity of the organization—survival of the business. Management is the brain of an organization, coordinating the other parts of the body and keeping them in balance. The pressures and needs of a particular period often lead management to overdevelop one side and neglect others for the long pull. For a number of years, he said, operating costs and public relations lost out to corporation lawyers, bankers, etc., who became predominant in management; but the trend is now in the other direction. He pointed out that research can also be overstressed and may hinder profitable operation. He urged that companies study their balance periodically and re-analyze their needs to meet existing conditions.

Dr. Haslam stated that the raw material situation of a business must be kept well in hand at all times as to quantity, quality, etc. Prospecting of new deposits should be carried on when necessary to insure future supplies. He declared that many companies are operating antique plants with high production costs which can in some cases be lowered to competitive levels by installing labor-saving equipment. The general delay in the past 12 years in buying needed equipment has resulted in forced buying later at much higher prices. A company should see that its equipment is at least on a par with that of its competitors.

Great savings can be made in many industries by lowering the cost of product distribution, said Dr. Haslam. Distribution costs form about 60 per cent of the total cost of goods we buy, and this condition can be improved greatly. We can reduce these costs by applying known methods more efficiently, and we can systematically develop new methods through organized research in this field, which is one of the most neglected areas in business today. He pointed out that when Standard Oil started research on this subject in 1933, the cost of distribution of its product was 40 percent of the wholesale price; today it is 15 percent.

Dr. Haslam also pointed out that competition from outside the industry is often overlooked, but that it can be more important than inside competition, as was the case with soaps vs. detergents, steam vs. diesel locomotives, etc. He also stressed the importance of research on the manufacture of new products, citing as an example the fact that, when German potash imports were cut off during World War I, over 40 companies were formed to produce it. Only one of these carried on original research, and this is the only one that has survived.

In discussing the importance of public relations Dr. Haslam said that customers, employees, stockholders, local citizens, government, etc., are all "publics" and that special study is needed on "relations." All these "publics" are people, and the basic treatment should be the same, although in many ways each group presents different problems. For 50 years government — local, state, national—has been the most important public a business has to deal with, but it has received less attention than most of the others. The ignorance of the general public on the subject of

• James A. Murray (Massachusetts Institute of Technology); John K. Selden (University of Toledo); Kent Jander (National Lime Association).

percentage depletion was given as an example, the implication apparently being that the public would approve of it for natural resource industries if they knew the facts. The speaker urged industries, either individually or through their associations, to follow a continuous program including all these activities, as they are all part of the main objective of management. Dr. Haslam concluded with the admonition that it is easy, but often fatal, to follow the beaten path when new problems and conditions keep arising.

Defense Minerals Administration The activities of the Defense Minerals Administration were described by Thomas H. Miller, assistant director, U. S. Bureau of Mines, Washington, who is now acting head of the Bureau. Mr. Miller first stated that safety activities are still an important part of the Bureau's activities and gave a brief resume of the safety work done in the last 40 years.

According to Mr. Miller, we are going through a mobilization period similar to that in 1941, which was also a peak civilian year; the only difference is that now we must at the same time produce for military needs as well. We are now in a twilight zone of neither peace nor war, and we must be prepared for the worst. Peak production is necessary to keep our way of life; and our strength depends on the cooperation of our industries and their capacity to produce. The speaker pointed out the increased value and volume of our industrial production in recent years and compared it with the even greater output which must be attained.

The mobilization plan, said Mr. Miller, calls for military production of $50,000,000,000 each year for the next three years without dislocating our civilian economy. At the end of that time we should be ready for any emergency. He described in some detail the expansion going on or planned in the steel and other vital industries. He said that this means an increased need for lime, indicating the necessity for expansion of capacity in that industry. The war needs, Mr. Miller believes, are being met with as little disruption of the civilian economy as possible. Our worst hazards, he declares, are inflation and complacency. War goods production is still lagging behind orders, but is gradually catching up, so that we may meet our needs in the time specified. This entire program, he emphasized, has nothing to do with the situation in Korea.

Mr. Miller then described the DMA, its aims, and its functions. It is, he said, ready to help industry get its needed materials and supplies. Most of the requests received from the lime industry to date have been for accelerated amortization. The DPA turns these over to DMA for recommendations.

Accelerated amortization, said Mr. Miller, is intended to help industry develop the additional capacity necessary to meet the demands for war materials without saddling these industries with post-war "white elephants." He pointed out that, even if the capacity of the lime industry nationally seems to be adequate to meet any demands, the needs actually fluctuate in different parts of the country, creating local shortages or oversupplies of different types of lime which cannot be overcome by shipping in from other territories. In encouraging the construction of added capacity, Mr. Miller said, DMA prefers to guarantee private loans rather than to make direct loans as the former are deflationary and the latter inflationary in their effect. He closed by describing the proper procedure for applying for serialization and told how it has been simplified so that the smaller producers can apply by letter. An industry committee for the lime industry has also been authorized.

• Mr. and Mrs. W. T. Sergy (Jones & Laughlin Steel Corporation).

Danger Ahead Title given his talk, *Centers of Initiative*, by Clem D. Johnson of Roanoke, Va., was only mildly descriptive as he gave one of the most forceful analyses of the "deplorable" state of our present economy ever presented before such a meeting. Mr. Johnson is a prominent Virginia businessman, heading a large warehouse firm, and was formerly a vice-president of the U. S. Chamber of Commerce and president of the American Warehousemen's Assn.

According to Mr. Johnson there is a tendency on the part of government to regard big business as an enemy of society and also to deprecate the profit system of business. This system, he said, is actually a profit-and-loss system and under it only the efficient can survive. Few realize, he said, how far we have strayed from our original democratic ideals. Our philosophy once was equal opportunity for all; now it is equal conditions for all. Security once meant security from oppression; now it means freedom from want and fear at the sacrifice of freedom of action. Every remedy for social or economic ills restricts man's freedom of action, and the mass man in this country is losing the ability to think for himself. He is now being bribed with his own money.

The speaker went back into history to show that the deterioration of a government depends on the extent of decay of the principles on which it was founded. Socialistic governments follow four stages. First there are promises, then increasing tax burdens; next comes the stifling of individual initiative, followed by the stifling of the right to protest. (We are, he said, now well along the third stage.) All such governments have failed, and we should take warning from this fact. Ignoring the law of supply and demand, Mr. Johnson declared, is like tying down the safety valve on a steam boiler—eventually it will explode. Now, he said, is the time for heroic citizenship. Freedom will be won or lost in this generation. The American free enterprise system is on trial, and the rest of the world is watching the outcome.

• Left to right: Michael Brisch (Rockwell Lime Co.); Harold Kugler; C. R. Atherton (Atherton & Evans); John M. Dalglish (Vermont Associated Lime Industries, Inc.).

• Paul Sunderland and Carl L. Morris (Ash Grove Lime & Portland Cement Co.) and Mrs. Sunderland.

Lime in Liquid Waste Filtration The use of *Lime for Liquid Waste Filtration* was the subject of a discourse by Edward F. Guillot, assistant sales manager, Filtration Engineers, Inc., Newark, N. J. The basis of his paper was the highly successful pilot plant of the Marblehead Company at South Chicago, Ill., which has done some remarkable pioneer work on the neutralization of pickle liquor with lime. Colored slides and some excellent motion pictures were used to illustrate this operation. A Feinc rotary vacuum filter is an important part of this plant.

According to Mr. Guillot there are 10,000 factories which discharge their wastes into our waterways. Of these only 2,600 have treatment plants, and most of those are inadequate. The steel industry has one of the worst problems with its acid waste, which contains up to 10 percent sulphuric acid and some iron. The average steel plant wastes about 20,000 gal. of this pickle liquor daily. The acid and iron must be removed, he said, in order to waste the liquor safely, and lime offers the cheapest means of doing it. The plant required to do this is centered about a rotary vacuum filter and only one man per shift is required to operate it.

Mr. Guillot also described the results obtained with such a plant for the recovery of wool grease, which almost pays for itself. In the treatment of fruit canning wastes the pectin content caused a serious filter problem which was solved by the use of lime. In the treatment of sewage, he pointed out, lime also plays an important part.

Lime in Steel Manufacture *Lime in Steel Making Process* was the subject of W. T. Sergy, steel works metallurgist, Jones & Laughlin Steel Corporation, Pittsburgh. He stated that lime and limestone are the two most important fluxes used in the steel industry, but that they have been taken so much for granted that other phases of the operations have received most of the attention. This situation is now changing, he said, as adequate supplies of these materials are now needed to meet the demands of the increasing steel output. Mr. Sergy said that the output of steel is expected to reach 120,000,000 tons in 1952, and that this will require 1,500,000 tons of lime. It will also require 35,000,000 tons of limestone for blast furnace flux and 8,000,000 tons for open-hearth furnaces.

Mr. Sergy briefly described the operation of a blast furnace in order to illustrate the functions of lime and limestone in the process. The manufacture of a ton of pig iron requires 1¾ tons of iron ore, 1 ton of coke, ½ ton of limestone and 4 tons of air. The ore, coke, and limestone are charged continuously into the top of the furnace in a definite sequence. CO gas is formed which separates the ore from the slag as it rises and also releases CO_2. The CaO creates a fluxing action and combines foreign substances, including much of the sulphur, into the slag. The limestone neutralizes impurities and, in order to do so, must contain some of these in itself. According to Mr. Sergy the limestone should contain as much CaO as possible; the silica content should be under 2 percent, sulphur should be under 0.35 percent, and there should be about 1 percent of alumina and 0.2 percent of phosphorus. The stone should be uniform in size, 2½ to 4 in., and should contain very little fines, as these interfere with draft in the furnace. Soft limestones slag most quickly. A blast furnace is drawn every four hours and produces about 1,200 tons of iron and 600 tons of slag daily.

The open-hearth furnace, said Mr. Sergy, is a basic chemical process, and capacity ranges from 175 to 500 tons of steel per heat with an average of about 250 tons. Its efficiency is much lower than that of a blast furnace, being about 17 percent. It is charged with limestone, blast furnace iron and scrap iron, the percentages of limestone and lime being governed by the analysis of the iron charge. In a 250-ton heat the limestone forms about 13 percent of the charge, or about 65,000 lb. The limestone is charged first and then the liquid iron. "Lime boil" is caused by the calcination of the limestone and the release of the CO_2. The CaO must flux the silica before other impurities can be removed. With the depletion of the best iron ore deposits, the silica content of the ore available is going up, and this will require more CaO in the process, increasing the amount of limestone and lime needed. The purity of the lime and limestone, said Mr. Sergy, is very important. The CaO content should be about 95 percent and the sulphur not over .07 percent in the lime. An increase in the sulphur content of steel from all sources from .04 up to .071 percent, he said, will cause a 9.2 percent drop in the output.

According to Mr. Sergy 1-man-size stone is preferred in large furnaces, but the use of bins limits the size to 6- to 8-in. Burned pebble lime is preferred in ¾- to ½-in. size. A limestone of sugary crystalline structure dissolves most quickly in the furnace. There is divided opinion on the effect of magnesia content.

Mr. Sergy also described the use of roasted dolomite or double-burned lime for patching furnace linings. He said that a 4- to 6-in. layer is placed in a hole in the bed and sintered in. Then another 6- to 8-in. layer, etc. All patching materials must be calcined, he stated, except sea-water magnesia.

Research Program Professor Walter C. Voss, head of the department of building engineering and construction, Massachusetts Institute of Technology, presided over the research session, which is always an important part of the annual conventions. Remarking that he first addressed an N.L.A. audience on research 16 years ago Dr. Voss summarized the progress that has since been made and described the integrated program now going on. He emphasized the fact that research, to be justified, must eventually pay off financially. He also mentioned the recent arrangement made with the University of Toledo for the study of applications for lime in concrete masonry structural materials. He said that most concrete products manufacturers use far too much cement, and that there is much to be learned about their dimensional stabilization.

Use of Lime in Concrete Units A report on *Research on Use of Lime in Concrete Masonry Structural Materials* was presented by John K. Selden, coordinator of housing research, Research Foundation, University of Toledo. This project, which is intended to determine the reasons for some of the problems encountered in the manufacture of consistently high-grade concrete blocks, and the cures for them, is jointly sponsored by N. L. A., the Portland Cement Association, the National Concrete Masonry Association, and other interested groups. Its three main objectives are: (1) to make a study of industrially produced blocks (three producers are cooperating in this); (2) to study the chemistry of cementition with various aggregates; (3) to study aggregate-cement-lime mixes made on standard commercial block machines. Ten different mixes were made, all based on 3 percent lime and 3 percent cement, and 3,000 to 4,500-lb compressive strengths were obtained with this extremely lean mix.

The university was fortunate in being able to get the loan of a Gocorp vibrating block machine, and 8 air-conditioned curing rooms were built which have all the necessary controls for all popular methods of curing. Cured blocks were also put through cycles similar to outdoor conditions and a record was kept of any cracking or other deterioration. It is already evident, said Mr. Selden, that improper curing is the major cause for concrete block troubles and that high-pressure curing is the best method. The only disadvantage is that it is expensive. With high-pressure curing, he said, there is little difference between a cement block and a lime-cement block, the silica content becoming the most important factor. Findings confirm the recent A.C.I. report that high-pressure steam-cured blocks have many advantages over other types, including less shrinkage, higher early strength, greater stabilization of foreign materials, higher acid resistance, and less leaching and efflorescence. This is not the only answer, however, as the aggregate mix and gradation has also been found to have an important bearing on block quality.

In closing Mr. Selden said that the concrete products industry is slow in changing its practices and that lime-cement-silica blocks will probably have to be promoted through large users in order to encourage their manufacture.

Sewage and Trade Wastes Dr. Willem Rudolfs, chairman of the Department of Sanitation at Rutgers University, was not able to be present to give his annual *Report on Sewage and Trade Wastes Research*, but his paper was read by William Parsons, research associate at Rutgers. He said that 2,000,000 tons of sulphuric acid was produced in 1950 and that most of this in time goes to waste. There are also 2 to 3 million tons of mine drainage which must be neutralized. Both lime and limestone are used for this purpose, but since the latter becomes coated and inactive, lime is the most popular. The sludge is removed by sedimentation, but there is some after-precipitation which coats the equipment and is hard to remove. High-calcium lime, he stated, creates no scale at a pH of 4 or 5, but scaling increases rapidly up to a pH of 9. Dolomitic lime creates no scale at a pH of from 4 to 9, and after-precipitation is only one-seventh that of high-calcium lime. Its only disadvantages are that the reaction time is double that of high-calcium lime, and the turbid effluent may also cause trouble in streams.

The most promising method lies in the close control of reactions, using either calcium or dolomitic lime, holding the pH as close as possible to 4. In this way little scale is created, which can easily be removed, and sludge formation is kept to the minimum.

Fundamental Research Professor James A. Murray, associate professor of materials, Massachusetts Institute of Technology, gave a report on the work being done under the fundamental research fellowship at M.I.T. which is being sponsored by the association. This research is being conducted without any definite commercial objective. One-year tests have now been completed which show a wide variation of calcining time required for the complete carbonation of the calcium in different limes. An interesting development is that the use of calcium chloride, sodium chloride, or sodium carbonate causes other dolomites to react in a manner similar to that of Ohio dolomite.

Professor Murray also stated that when an average high-calcium limestone is burned at a temperature of 1,800 deg. F., its surface area is much lower than that of calcite similarly treated; the rate of slaking is about half, and the porosity about the same. When burned at a temperature of 2,200 deg. F., the surface area dropped sharply and the porosity dropped to slightly below that of calcite. Various slides illustrated the results obtained. An experimental laboratory slaker was also described which has two horizontal shafts with paddles and which gives complete agitation at 60 r.p.m. or over.

Lime Soil Stabilization In his report on lime stabilization research at Purdue University Professor K. B. Woods, professor of highway engineering at Purdue, said that tests are now being conducted on durability and resistance to freezing and thawing. He also described the use of a sonoscope similar to those used for testing concrete in large structures, and cited the many advantages of this method of nondestructive testing. The results obtained with this instrument have been checked closely by breaking concrete specimens.

Professor Woods gave the results of tests on stabilized soils using various percentages of high-calcium lime. A Midwestern soil classified as young drift and cured up to 15 weeks gave best results with 10 percent of lime, and there was a considerable improvement in characteristics in the period between 8 and 15 weeks. Old drift soil was more difficult to stabilize, and the strengths were lower but still good. Clay-gravel soil was easy to stabilize, but the strength was the lowest of the three types, and there was little gain in the 8- to 15-week period. Where compaction was used, the gain was greater in the soils in which lime was used than in those without. In durability after freezing and thawing, however, the

(*Continued on page* 102)

WASHINGTON NEWS LETTER

Rising Expenditures for New Plant and Equipment

A RECENT Department of Commerce report provides good news for the construction and allied industries. The study shows that American business, exclusive of agriculture, now has scheduled expenditures for new plant and equipment during 1951 at a new high rate of $23,900,000,000 or $5,400,000,000 above 1950. If these plans are realized, capital outlays this year will be 29 percent above the 1950 figure and 24 percent above 1948, which was the previous peak year. The survey results indicate that each major industry and companies of every size expect to expand their 1950 rate of investment, and that businessmen are planning to maintain a high rate of expenditure throughout 1951.

Because costs have risen, this increase in dollar volume reflects a somewhat smaller increase in the physical volume of new plants and equipment. But even so, businessmen's plans call for increasing the physical volume by at least 20 percent.

The largest increases above 1950 spending are planned by manufacturers, who expect expenditures to increase by 45 percent. Within manufacturing, the defense and related industries are planning substantially greater percentage increases in capital outlays during 1951 than other groups. Industries such as steel, non-ferrous metals, and non-automotive transportation are expecting at least to double 1950 spending. Electrical and non-electrical machinery industries, chemicals, paper, and automobile companies anticipate rates of expansion well above the overall average in manufacturing. Even industries producing primarily consumers' goods such as food, apparel, furniture, and printing and publishing are projecting to spend more than in 1950.

Of special interest to the construction and related industries, such as the pit and quarry industries, is the fact that manufacturers' investment programs in 1951 contain a larger than normal volume of completely new projects. This means that a large proportion of the increased expenditure will go into new plants.

In addition, non-rail transportation companies are planning a 40 percent increase over 1950, while the railroads are planning a record breaking expenditure exceeding 1950 by one-third. Mining and utilities will also continue to expand.

It must be recognized that these very encouraging data deal only with businessmen's plans for expansion. Whether these plans will be converted into reality is quite a different matter. In that connection, there are many forces at work.

Effect of Accelerated Amortization

The Revenue Act of 1950 included provisions to stimulate private expansion of industrial facilities to increase the supply of basic raw materials and other essential military and civilian goods. It followed the World War II pattern quite closely. Businessmen whose expansion programs have been approved by the government are permitted to amortize for tax purposes all or a part of the cost of the needed expansion over a period of five years, rather than over the longer life of the facilities involved.

This program began in October, 1950. By the end of April, 1951, almost 8,600 applications had been received. Over 1,100 projects estimated to cost $5,000,000,000 have been certified for amortization. Thus far, the stress in the amortization program has been on manufacturing facilities which account for 90 percent of the value of facilities having necessity certificates. Within manufacturing, steel and non-ferrous metals alone account for almost 60 percent of the facilities approved.

The rapid amortization privilege is a powerful advantage to businesses which can qualify. They recover their costs quickly, thereby reducing the possibility of later loss of value and they receive large tax offsets during the high-tax period.

Recently this program has come in for some Congressional criticism. The chief complaint was that the certificates of necessity were dealt out almost exclusively to the industrial giants. Small businesses received practically none of the advantages. It appears now that the program is likely to continue only if it can demonstrate that it services all facets of the American economy.

By S. HERBERT UNTERBERGER

Incidentally, the American system is in substantial contrast with the Canadian system which was designed to accomplish the same purpose. We permit the continuance of past depreciation practice for new capital goods regardless of whether they are related to defense or not. If they are especially important to the defense effort, we allow an extremely liberal depreciation rate. Despite a shortage of capital goods, this program discourages no capital expenditures but does offer powerful encouragement to certain types of capital expenditures.

The Canadians are going at this problem in just the other way. They are trying to discourage business capital expenditures of a less essential nature. To do this, the government's budget proposes that depreciation on capital assets acquired after April 10, 1951, should not, in general, be allowed as a deduction from income for tax purposes until the beginning of the fourth year following the year of acquisition. Exceptions will be automatic for certain highly essential goods. Other exceptions will be made upon certification by the government that the assets are to be used for defense purposes. It is expected that this device will be a stiff financial deterrent to the initiation of projects that can not be justified as essential or whose long-run value is uncertain.

Effect of Credit Restraints

Despite the government's encouragement of capital expenditures through the allowance of rapid amortization, the grandiose plans of businessmen for capital expansion in 1951 will probably not be fully realized. This result will not flow from any direct government action but rather from certain voluntary measures which the government has encouraged.

Under the authority contained in the Defense Production Act of 1950, the Federal Reserve Board has organized the National Voluntary Credit Restraint Committee composed of representatives of banks, insurance companies, investment banking houses, mutual savings banks, and savings and loan associations. The purpose of the committee is to encourage financing institutions to conduct their credit operations in such a way as to contribute

(*Continued on page* 102)

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23rd ANNUAL CEMENT-MILLS SECTION

JULY 1951

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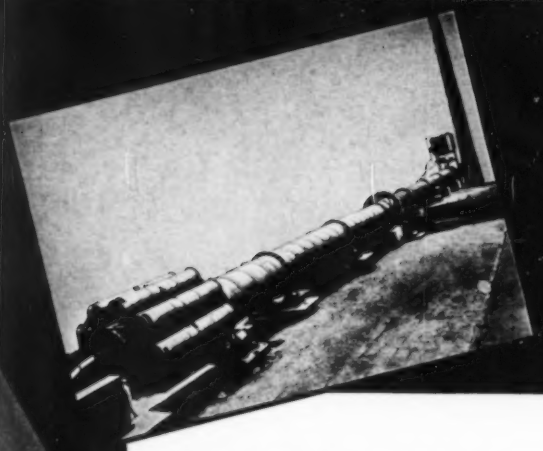

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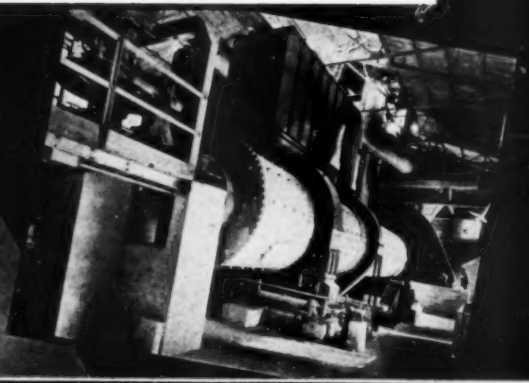

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ALL THREE new cement plants chose EASTON SIDE-DUMPS

BP-1114 Body with STERLING

Illustration below shows a double-bottomed EASTON TD-1222H Drop Door Side-Dump Trailer with MACK LR, capacity 45 tons. Investigate these, and other EASTON Side-Dump Trailers and Truck Bodies.

All three of the new cement plants which will operate quarries in the United States (classified as under construction or definitely planned for 1951)*, have chosen EASTON Side-Dumps for quarry haulage.

- **Two of the new plants will use EASTON Model TP-1114 pan type side-dump trailers with Mack LFT's.**
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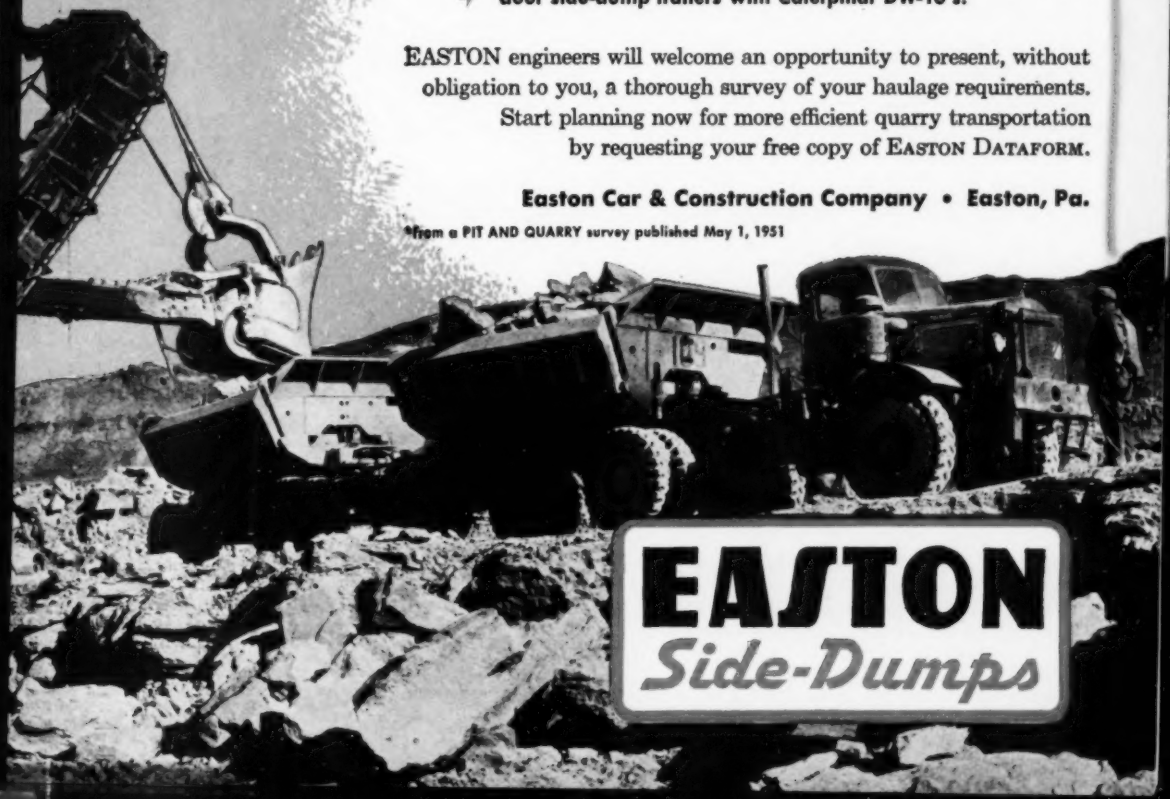
*from a PIT AND QUARRY survey published May 1, 1951



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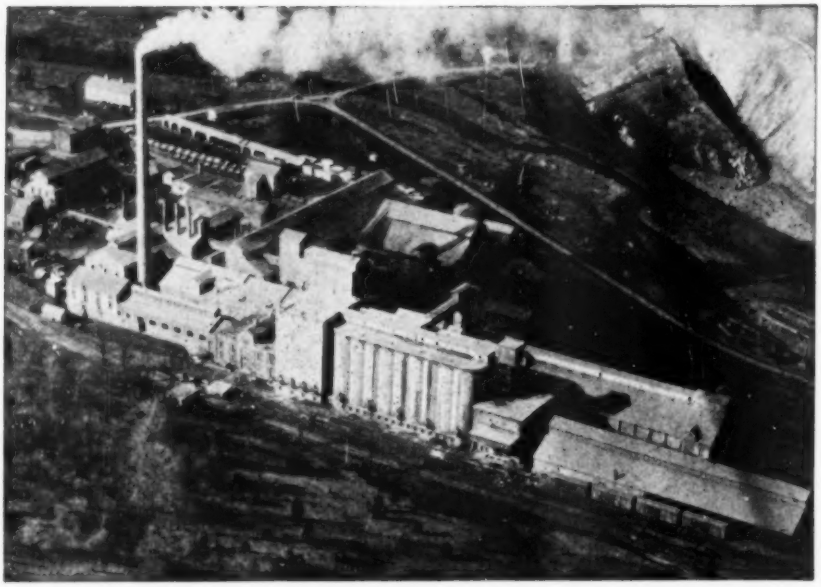
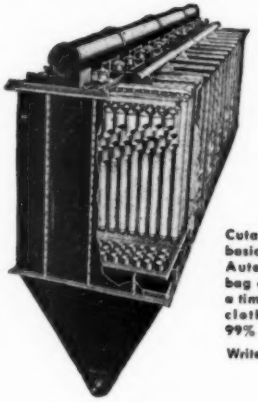


Dust Control Steps Up Cement Production

In modern cement production Norblo dust collection and cement air cooling are fully integrated into the production process. Norblo Automatic Bag Type Dust Collectors are installed in raw and finish millrooms, on stone dryers, combination grinding and drying units, primary and secondary crushing, and in packhouses and with bulk handling into and out of silos. Norblo Automatic Bag Type equipment operates continuously, 24 hours a day and maintains constant pressure drop.

Norblo cement air cooling is an expansion of the normal mill room dust collecting system to control the temperature of the finished cement as it passes through the separator and into storage and to control the temperature of the grinding mill by lowering the temperature of tailings being recirculated. Write for Bulletin No. 165-1 fully describing Norblo Cement Air Cooling.



Cutaway shows Norblo basic unit of 78 bags. Automatic shaking and bag cleaning, one unit at a time, insures full use of cloth area better than 99% of the time.

Write for Bulletin 164-2

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Cut Cooling Costs

these 3 Ways

1. CUTS ROTARY KILN FUEL COSTS

Air-Quenching grate cooler actually returns 75% of sensible heat in clinker back to kiln as secondary combustion air. Clinker is cooled quickly, to a temperature where handling is no problem, by means of cooling air coming up through the relatively thin bed of hot material on grate.

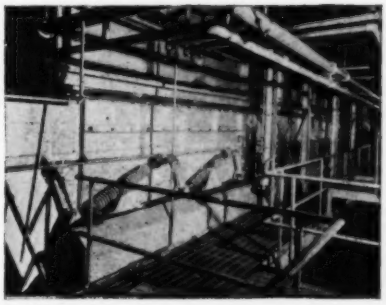
2. CUTS CLINKER GRINDING COSTS

Air-quenched clinker is easier to grind — capacities of clinker grinding mills handling hard-to-grind clinker have been increased as much as 10% with the installation of an air-quenching grate cooler. Rapid cooling also helps nullify the detrimental effects of magnesia in clinker.

3. CUTS MAINTENANCE COSTS

Reciprocating motion of grate is carried on flexible rubber bushings and springs. No wearing parts and no slippage. Clinker does not slide on grate, it hops, gently and steadily. Lubrication is negligible, only four grease fittings on entire cooler. Maintenance cost runs as low as 1/10 cent per barrel.

COOLS 100 BARRELS AN HOUR FROM 2500° TO 90° F.
In the modern plant of Dewey Portland Cement Co., Davenport, Iowa, this 4½ x 70 ft Allis-Chalmers air-quenching grate cooler cools 100 barrels of cement clinker per hour from 2500° F. to approximately 90° F. It's one of three Allis-Chalmers grate coolers installed here.



Save on Installation Cost, Too!

The air-quenching grate cooler comes as a complete unit, fits into existing plants readily because it operates horizontally. Installation costs are 10 to 30 percent less than the cost of installing any other type of cooler! Get more facts from the Allis-Chalmers representative in your area, or write for Rotary Kiln Bulletin 07B6368A. Allis-Chalmers, Milwaukee 1, Wisconsin.

Pulverator is an Allis-Chalmers trademark.

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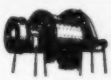
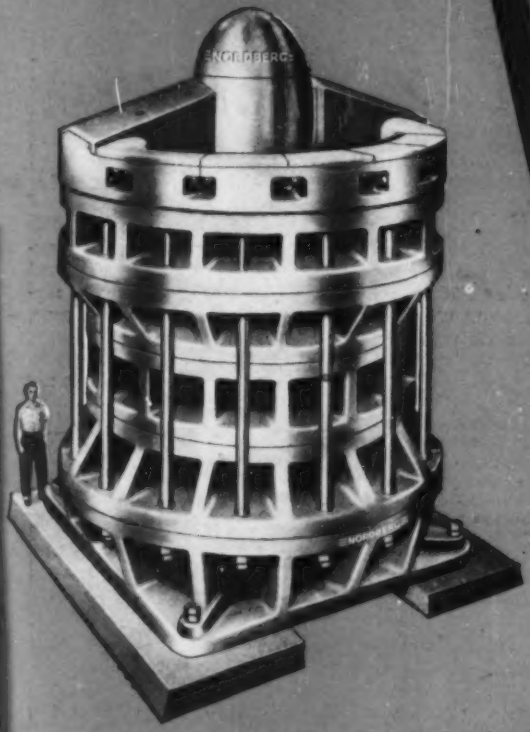

Grinding Mills

Gyratory Crushers

Kilns, Coolers, Dryers

Proven

NORDBERG *for* CEMENT

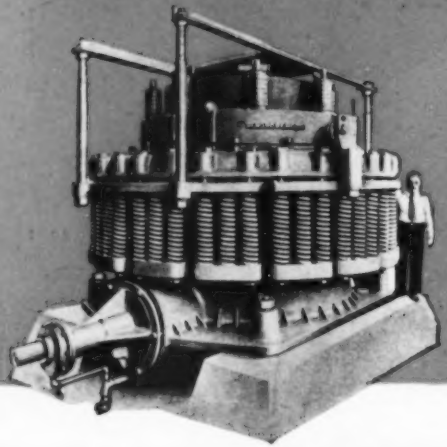


HERE is dependable NORDBERG MACHINERY designed and built especially for the CEMENT INDUSTRY—to assure maximum and continuous production at low operating and maintenance costs. FROM PRIMARY AND REDUCTION CRUSHING AND SCREENING OF RAW MATERIALS, THROUGH THE SUCCESSIVE STAGES OF RAW GRINDING, CALCINING, AND FINISH GRINDING, NORDBERG PROCESSING MACHINERY HAS BEEN PROVEN IN SERVICE BY CEMENT PRODUCERS THROUGHOUT THE WORLD.

NORDBERG CEMENT MACHINERY includes Gyratory Crushers for primary breaking; Symons Standard and Short Head Crushers for preparation of finely and uniformly sized mill feed; Vibrating Grizzlies and Screens for scalping and sizing; wet and dry grinding Ball, Tube, and Compartment mills; Rotary Dryers, Kilns and Coolers.

For dependable low-cost power, a complete line of NORDBERG DIESEL ENGINES is available in sizes ranging from 10 h.p. to 9600 h.p.—a range of sizes to provide the solution to practically any power problem the Cement Industry may have.

GYRATORY and CONE CRUSHERS for Primary, Secondary and Fine Reduction Crushing



VIBRATING GRIZZLIES and SCREENS for Scalping and Sizing

MACHINERY *the* INDUSTRY

Dependable

DRYERS, KILNS and COOLERS for Pyro Processing Operations, Drying, Calcining, Burning and Cooling

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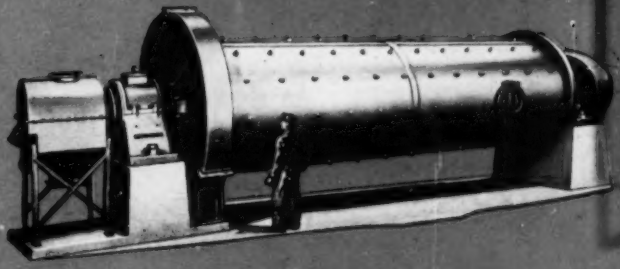

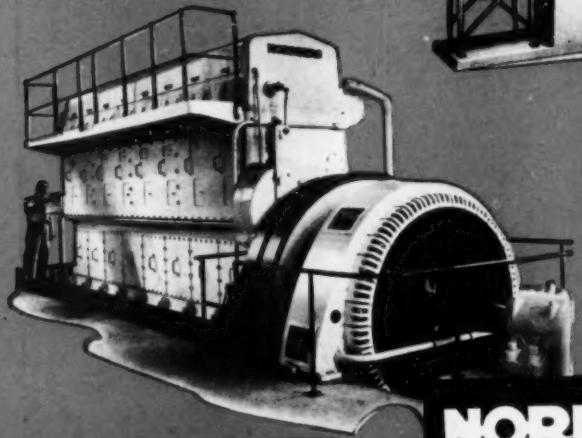

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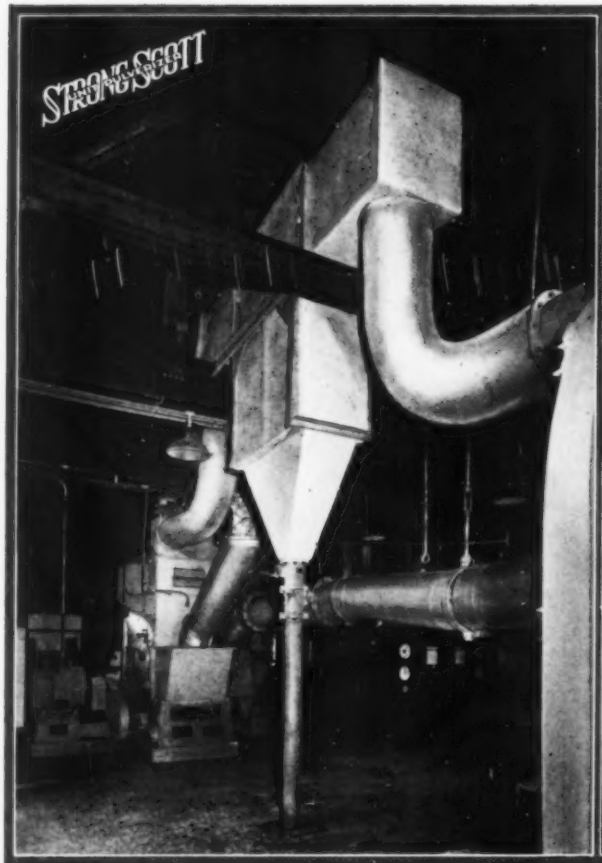

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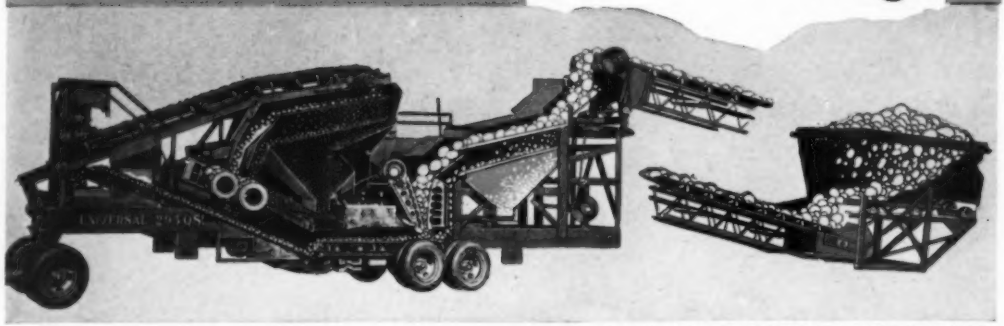

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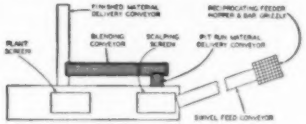

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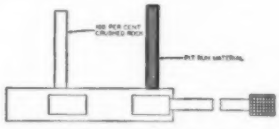

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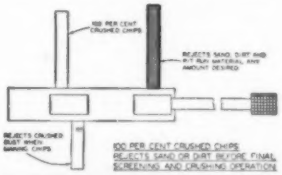
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Some Results of Louisville Cement's Modernization Program at Speed, Ind.

another ON THE SPOT report

ABOUT two years ago the Louisville Cement Corporation of Indiana completed a broad program of modernization and improvement at its portland cement plant located at Speed, Ind. The program included the installation of a new 10- by 150-ft. rotary kiln, the construction of an entirely new clinker grinding department, and the installation of three modern single-pass vertical tube waste-heat boilers, equipped with electrical precipitators for the collection of dust from the kiln stack gases.

These changes have yielded a number of operational advantages which should be of interest to people in the cement industry. Two older kilns, formerly hooked up to a common boiler and flue, are now producing more clinker and more steam as a result of their complete separation into individual operating units. The new clinker grinding department which was placed in operation in June, 1949, is far more efficient than the old two-stage milling department which it has partially replaced. In addition, its design incorporates features of flexibility which will enable the company to study various methods of grinding in actual plant practice, and to produce efficiently the several types of cement which the market now demands.

By WILLIAM M. AVERY

New Kiln Louisville's newest kiln, a 10- by 150-ft. Allis-Chalmers unit, went into production in the spring of 1948. It was installed primarily to replace the two oldest kilns in the plant, which had been in almost continuous service since 1906. The retirement of these units, however, has been postponed by the tremendous demand for cement, with the result that at present seven kilns are in production.*

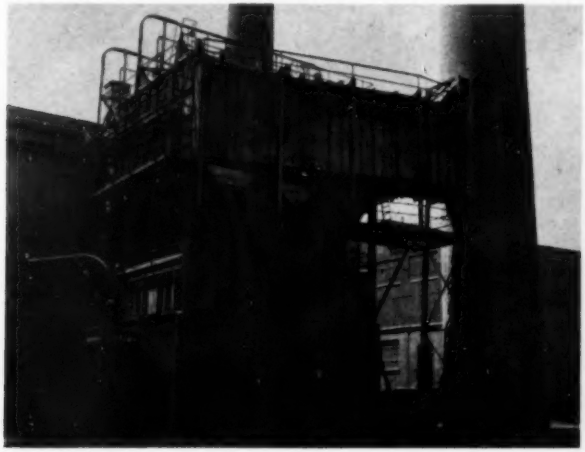
No. 7 kiln has a welded steel shell supported on two piers, and it is driven by a 60-hp. 4-speed induction motor through a Falk double-reduction speed reducer. The pitch is ⅜ in. per ft., and the speed of rotation may be set at 28, 34, 56 or 76 revolutions per hour. Both the cone-shaped feed end, and the tight-fitting hood on the discharge end, are air cooled.

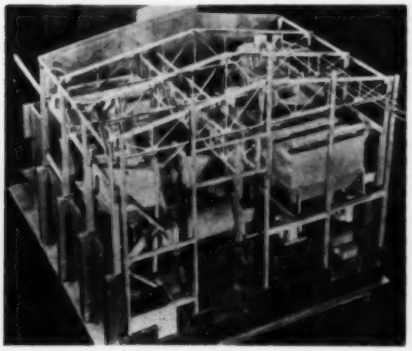
The lining is made up of the following: 1 ft. of nose brick lining consisting of regular fire brick; 10 ft. of 9-in. regular fire brick; 30 ft. of 9-in. high-alumina brick; 10 ft. of regular 9-in. fire brick; 88 ft. of 6-in. regular fire brick in combination with 2½-in. Johns Manville Superex insulating block; 3 ft. of 9-in. regular fire brick; and finally 8 ft. of 9- by 6-in. regular fire brick in the tapered feed section.

No. 7 kiln is fed by a Fuller Airlift and Constant-Head Feeder, a unit which elevates the raw feed after placing it in a semi-fluid state by means of aeration and discharges it into an open-topped box from which a screw conveyor does the actual feeding. This system was first tried on the company's No. 6 kiln, and in both applications it is said to have given excellent results in respect to feed uniformity and continuity of operation. The feed is aerated by piping air at 4 to 5 p.s.i. to special ceramic blocks located in the base of the hopper. Excess material elevated by the Airlift overflows the box which houses the screw conveyor and drops back into the hopper. The speed of the feed screw is synchronized with the kiln speed, but in practice the kiln speed is usually held constant and the rate of coal feed and draft are varied.

Kiln No. 7, as well as 5 and 6, is direct fired with coal by a Raymond 402 bowl mill, operating in conjunction with a Raymond 16K53 exhauster fan. Identical bowl mills are

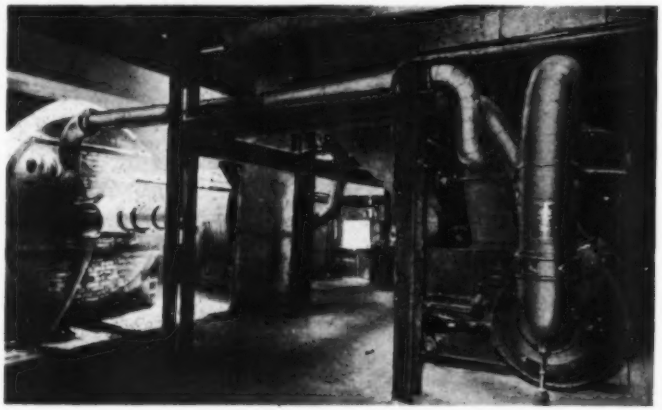
*Since this report was written, word has been received that an eighth kiln measuring 11 by 390 ft. is under construction. The company expects to have this unit in production by midsummer.



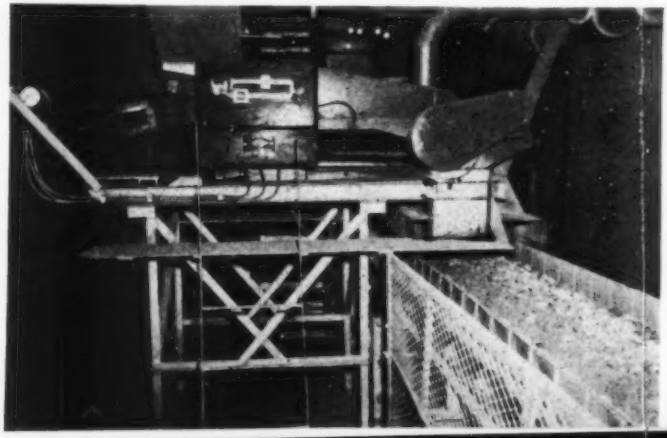


Left: View of the electrical precipitators which serve the three largest kilns. Recovered dust is pumped back to the raw grinding department. Below: Scale model of the new clinker grinding plant, made to facilitate study of the relationship of various operating units.

Above: General view of No. 7 rotary kiln at the Speed, Ind., plant of Louisville Cement Corp. The constant head air-lift feeder is at the left. Below: Installation of two unit pulverizers used for firing kilns No. 1 and 2.



Below: Measured amounts of clinker and gypsum are separately fed from storage hoppers onto a pan conveyor which discharges inside the new clinker grinding department.



also used to fire kilns No. 3 and 4, but these are equipped with somewhat smaller fans. On a feed of minus 1½-in. coal these mills have a capacity of about 3 t.p.h. In 1947 No. 1 and No. 2 kilns were equipped with Strong-Scott Unit Pulverizers for direct firing.

Controls for No. 7 kiln were selected with the thought of utilizing it in part as a sort of pilot unit on which the effect of various methods of operation could be accurately determined for possible later application to the other kilns. Included are a Bailey continuous oxygen analyzer, automatic draft controls, a radiation pyrometer at the burning zone, a kiln speed indicator, and various controls for the operation of the direct-firing coal mill.

Control instruments for kilns No. 5, 6, and 7 are mounted on a single panel in a separate glass-partitioned room adjoining the firing floor. Similarly, a single control panel serves all three of the new waste-heat boilers, as well as the boiler which is common to the first four kilns. One burner operates kilns No. 5, 6, and 7, whereas kilns No. 1 and 2, and 3 and 4 are operated in pairs by two burners.

Waste-Heat Boilers In connection with the general program to improve operating efficiency, new waste heat boilers were installed for the new kiln, and for the two adjoining 10- by 150-ft. kilns. These are B&W single-pass 3-drum vertical tube waste-heat boilers with super heaters and economizers, and each is served by a Cottrell precipitator and its own individual 60,000-c.f.m. Sturtevant induced-draft double-inlet fan located on the inlet side of the precipitator. All three kilns exhaust through a single 10- by 210-ft. reinforced-concrete stack built by Rust Engineering Co. The stack is lined for about 50 ft. with 4-in. hard burned red brick.

Each boiler has 8,600 sq. ft. of heating surface, and has a design capacity of 20 to 22,000 lb. of steam per hr. Gas temperatures drop from about 1,600 to 600 deg. F. through the boilers, and to about 380 deg. F. through the economizers.

Kilns No. 5 and 6 were formerly linked to a single 3-pass B&W waste-heat boiler which had been in service for 33 years. It, and a similar unit which still serves four smaller kilns at Speed, are believed to have been the first B&W boilers ever installed on portland cement kilns.

The replacement on kilns No. 5

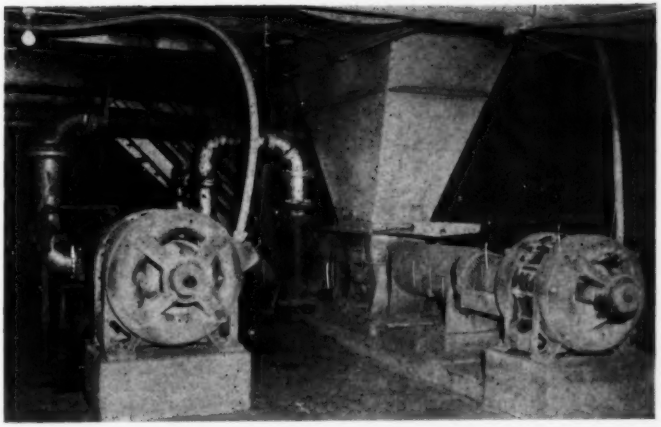
and 6 was prompted mainly by the desire to obtain individual control of draft, although the new single-pass units are of course also far more efficient. The drop in draft through the new boilers is less than half the drop through the units they replaced, with the result that two 75-hp. fans draw only about 35 hp. each in doing the job that formerly required a 300-hp. fan. The resulting low gas velocity tends to minimize the abrasive effect of the dust laden gases on the fan blades.

The company's long - standing practice has been to make maximum use of waste heat for generating steam to make electrical power, but experience has indicated that maximum economy results when the kilns are fired wholly with a view to the efficient production of clinker. For this reason three stoker-fired boilers were installed some years ago to supply additional steam for power generation. Formerly two of these units were required to supply power for the cement plant, but with the installation of No. 7 kiln and the greatly increased efficiency of the new waste-heat boilers, it is now usually necessary to operate only one of the stoker-fired units. The situation has also been improved by the installation of a modern cooling tower to replace the spray pond formerly used. The tower has a capacity of 15,000 g.p.m., and the resulting vacuum is sufficient to permit carrying a full load on each of the three generators under all weather conditions.

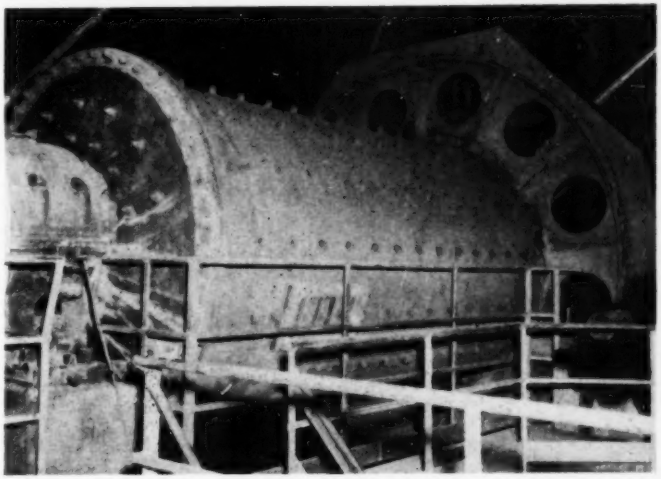
No changes were required in the power plant itself, which consists of Westinghouse, General Electric, and Allis-Chalmers steam turbine generating units which are rated at 3,000, 2,000 and 1,000 kw. respectively. Under most operating conditions it is possible to pull the full 6,500 kw. load. The power factor normally runs about 85 percent. The company generates all the power for its portland cement plant, but the adjacent Brixment plant is operated on purchased power.

Precipitators Although the Cottrell precipitators were built in a single unit, each kiln is separately served. Capacity per kiln is about 50,000 c.f.m., but only about 30,000 c.f.m. is actually passed through each unit. As against a guarantee of 90 percent efficiency, the performance of the precipitators is believed to be much closer to 98 percent.

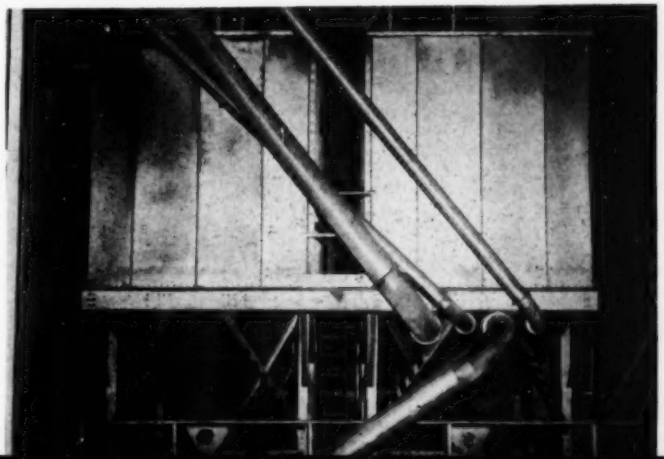
The precipitators recover a total of approximately 45 tons per day from the three kilns served. This dust is drawn from hoppers and

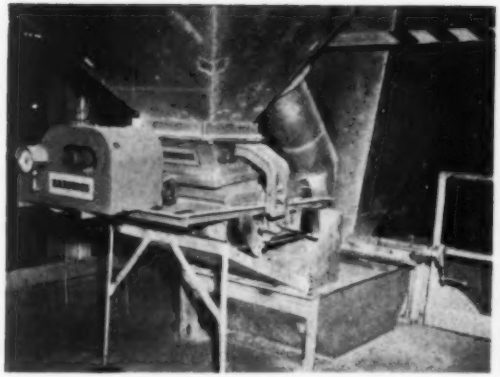


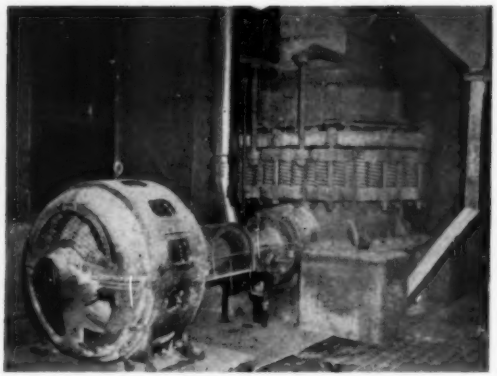
Above: The rotary compressor and the 10-in. pumping unit which convey the product to storage silos. Below: View of the 9- by 15-ft. secondary ball mill.



Below: Both mills, the 18-ft. air separator, and all bucket elevators in the grinding plant are vented to these bag-type dust collectors.







Left: This feeder, operating ahead of the preliminary ball mill, is controlled by an electric "ear" which picks up and amplifies the sound from the mill. Right: First stage of processing in the clinker grinding department is in this 4-ft. cone crusher.

pumped back to the raw grinding department by means of a Fuller-Kinyon pumping system. There it is fed into the air separator circuit on the discharge side of the tube mills.

Clinker Grinding Louisville's new clinker grinding department has a capacity of about 3,500 bbl. in 24 hr. It utilizes large ball mills in series grinding, and the design provides for future expansion to double its present capacity. Until this expansion is carried out, an older open-circuit mill with a capacity of 5,500 bbl. in 24 hr. (on standard cement) will be operated to supplement the output of the new grinding department.

The building which houses the new finish grinding facilities was built from the north three bays of the clinker storage shed. Although this arrangement resulted in some reduction of clinker storage space, it was felt that this slight disadvantage was more than offset by the convenience of the location. As a part of the installation, new clinker and gypsum bins were built at the north end of the covered storage area, and a new Bedford 10-ton capacity overhead crane, equipped with a 3½-cu. yd. bucket, was installed for handling and turning the clinker in storage. Gypsum, and clinker from outside storage, are placed in separated bins by means of a receiving hopper, bucket elevator, and an overhead belt conveyor.

Separate Jeffrey Model 330 and Model 450 Way-Trol feeders draw measured amounts of gypsum and clinker from the bins, and the materials drop onto a Jeffrey pan conveyor by means of which they are delivered to the mill building. A third Way-Trol feeder located under the bins serves as a spare, or for occasional use in blending different clinkers.

Inside the mill building the blend of clinker and gypsum is elevated and discharged into a Symons 4-ft. Short Head cone crusher which reduces the feed to minus ½-in. The crushed material is then re-elevated and discharged into a 150-ton mill feed bin located ahead of a 9- by 15-ft. Allis-Chalmers preliminary ball mill.

Feed to the preliminary mill is by means of a Hardinge Feedometer, the rate of feed being controlled by a Hardinge "Electric Ear." The latter device utilizes a microphone set up beside the mill so to control the rate of feed as to maintain a predetermined sound level indicative of the most satisfactory grinding performance. The desired sound level, which is an accurate measure of the load level in the mill, is selected by adjusting a dial, and the feeder is automatically turned on and off to maintain that level. The method is said to compensate for inadvertent changes in feed rate, as well as for differences in the size and hardness of the material being ground.

The preliminary mill, which is driven by a 600-hp. Allis-Chalmers synchronous motor, has a 94,000-lb. charge of forged steel grinding balls graduated from 3½ to 1½ in. in diameter. More specifically, the charge consists of 23,000 lb. each of 3½- and 3-in. diameter balls, 29,000 lb. of 2-in. and 19,000 lb. of 1½-in. The product of this mill is elevated and discharged into a feed bin from which the 9- by 15-ft. Allis-Chalmers secondary ball mill is supplied. The secondary mill, which is also driven by a 600-hp. synchronous motor, is charged with 94,000 lb. of 1¼-in. diameter Allis-Chalmers Concavex grinding balls.

The discharge of the finish mill goes to an 18-ft. Raymond air separator, from which the rejects are all returned to the preliminary mill by means of a 24-in. by 52-ft. enclosed Link-Belt screw conveyor. This screw conveyor operates in an unlined steel casing of rectangular cross section, and it is driven by a 30-hp. Link-Belt Electrofluid drive. It returns the air-separator rejects to the feed end of the preliminary mill, where the material is elevated and discharged into the feed hopper for regrinding in the same closed circuit. There is also a screw conveyor which makes it possible to by-pass the preliminary mill, but normally it is not used. Finished material drops by gravity into a feed hopper, and is pumped to storage silos by means of a 10-in. Fuller-Kinyon Type L-10 conveying system, air for this purpose being supplied by a Fuller Type C-300 rotary air compressor.

The mills and the bucket elevators in this modern closed-circuit grinding plant are vented to two Northern Blower Norblo bag-type dust collectors. The fine material recovered by both collectors is discharged back into the secondary ball mill. The 18-ft. separator is also vented to one of the Norblo units to effect as much cooling of the cement as possible. As a result of this provision, clinker which enters the mills at an average temperature of about 150 deg. F., leaves them at a temperature of not over 200 deg. F. If the separator were not vented to one of the collectors, the temperature rise would in all probability be increased by 25 to 50 deg. The collectors also provide the only means used for cooling the ball mills.

The new grinding department is

served by six bucket elevators. Three of these (handling feed to the secondary mill and air separator, and return tailings to the preliminary mill) are Link-Belt super-capacity continuous type, with 24- by 12-in. buckets mounted on two strands of 18-in. pitch bushed-bar link steel roller chain. The remaining three are Link-Belt centrifugal-discharge elevators, equipped with 16- by 8-in. malleable iron buckets mounted on a single strand of 6-in. pitch bushed-steel roller chain. All are individually driven by electric motors through enclosed herringbone gear drives and roller chains.

In practice the new mill is used almost entirely for grinding special cements, and the old mill, which is not equipped for grinding special types, is kept on standard cement all the time. On standard cement the new mill would have a grinding capacity of about 150 bbl. per hour, whereas actual output of high-early-strength cement, for example, is only about half this amount.

Facilities in the new grinding department, other than those already referred to, include a recording thermometer for checking clinker temperature ahead of the preliminary mill, and a vacuum cleaning system which is hooked into one of the dust collectors. Primary equipment in the old clinker grinding mill includes a Bradley mill and five F. L. Smidth Kominuters on the preliminary end, and four No. 16 and four No. 18 F. L. Smidth tube mills on the finish end.

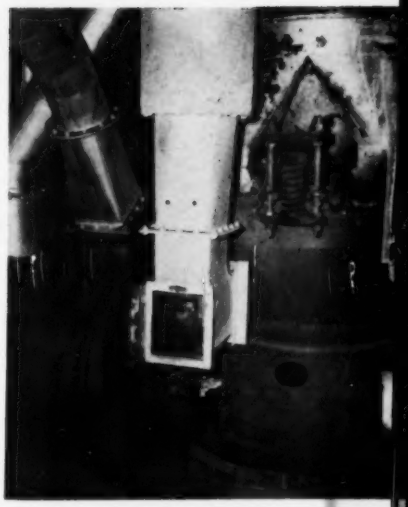
Productive Capacity As mentioned earlier, Louisville's broad program of modernization was aimed squarely at increasing the efficiency of various departments in the plant. In addition, however, to a number of operational advantages, including increased steam production, the output of clinker has, of course, been increased. As a result of the improvements made, kilns No. 5 and No. 6 have shown a marked increase in both efficiency and output.

With all seven kilns in operation, the present productive capacity of the mill on portland cement is about 6,000 bbl. per day. This is accounted for as follows: kilns No. 1 and No. 2 (7- by 100-ft. units installed about 1906) have a combined output of about 600 bbl. per day; kilns No. 3 and No. 4 (8- by 10- by 162-ft. units installed in 1908) have a combined output of about 2,000 bbl. per day; kilns No. 5 and No. 6 (10- by 150-ft. units installed in 1910) have a combined output of about 2,200 bbl. per day; and finally about 1,200 bbl. per day from the 10- by 150-ft. No. 7 kiln, installed in 1948.

History The Speed plant is operated by the Louisville Cement Corp. of Indiana, a wholly-owned subsidiary of the Louisville Cement Co. The present name of the firm was adopted in 1869; but under such names as the Louisville & Portland Canal Co., and the Louisville Hydraulic Cement & Waterpower Co., the organization can trace its origin clear back to 1830.

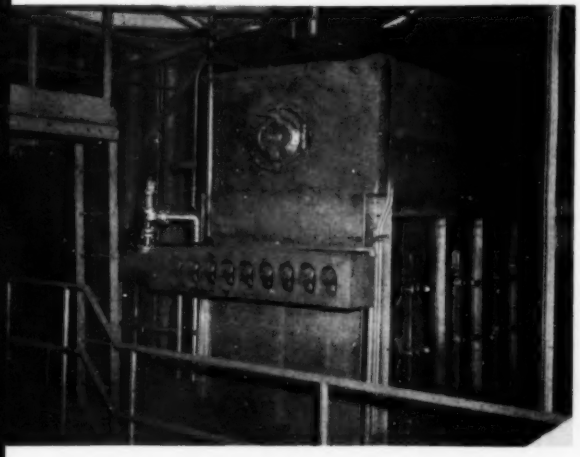
The company's operations at Speed date back to 1868, when eight vertical kilns were constructed for producing natural cement. These units are still in operation. Construction work on the first units of the portland cement plant began in 1905, and the first portland cement was produced in February, 1906. The present plant now produces

(*Continued on page* 107)

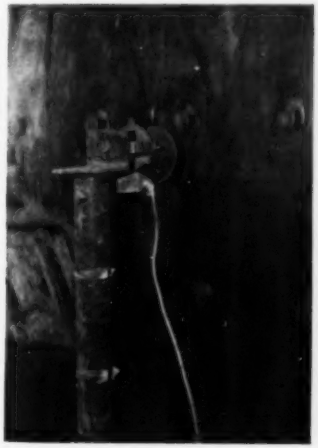


Above: The direct-firing bowl mill which serves No. 7 rotary kiln.

Above: Thomas McDonald, chief engineer of Louisville Cement Corp.



Left: One of the new single-pass vertical tube waste-heat boilers.



Right: View of the microphone which serves to regulate mill feed by the level of sound coming from the mill.

A World-Wide Review of the Portland Cement Industry

PART IV—ASIA AND THE NEAR EAST

INDIA, PAKISTAN, AND NEPAL

THE critical cement situation which had prevailed in India since the war improved considerably in the latter part of 1949. Production in the last quarter of that year totaled about 618,000 long tons, for an estimated total of about 2,102,000 tons. This was 35 percent over the 1948 output and 45 percent over that of 1947. The 1950 output increased sharply to 2,600,000 tons. There are at present 23 portland cement plants in India, with a total annual capacity of 2,643,000 metric tons. Of these 11 mills with a capacity of 1,867,000 tons belong to the Associated group, three (290,000 tons) to the Dalmia-Jain group. Six, with a capacity of 486,000 tons, are independent.

Expansion plans of the industry provide for the enlargement of six of the Associated plants by 433,000 tons, two of the Dalmia-Jain plants by 310,000 tons, and two of the independent plants by 60,000 tons each. New plants either under construction or proposed include a 200,000-ton plant for Associated at Sevalia, 150,000-ton plants for Dalmia at Jaipur and Orissa, and five new plants for the independents. One of the latter will be located at Travancore (50,000 tons), a Government-owned plant (200,000 tons) in the United Provinces, one at Sindri (200,000 tons), one at Bagalkot (100,000 tons); and one, location not known, will be called New Hindustan (100,000 tons). The Uttor Prodesh plant in Mirzapur, one of the biggest of the state's enterprises, to be completed in 1952, will cost $7,350,000.

This is all a part of a plan announced by the Government of India in 1947 to double the output of the industry in that country by 1952. This plan included 19 new cement plants and the expansion of 15 of the then existing plants. Orders for equipment for these plants were placed with manufacturers in the United Kingdom, Denmark, and the United States.

History The history of the portland cement industry in India goes back about 50 years. The first cement was manufactured in Madras in 1904, and by 1913 there were three plants. By the end of World War I these plants were producing 84,000 long tons annually and were supplying over 80 percent of the needs of the country. After the war, demand increased so rapidly that seven companies were started between 1919 and 1922. Production rose to 564,000 tons in 1930, but this was so far below the capacity of the ten plants then in operation (820,000 tons), that prices fell to unprofitable levels. The government was unwilling to increase the duty on cement imports sufficiently to protect these operations; so the producers formed their own marketing organization in 1926, which evolved into the Cement Marketing Company of India, Ltd., in 1930. Sales from the different companies were made on a quota basis. This worked quite well until 1935, when it was found that much of the cement was being shipped unnecessarily long distances.

These cement plants, therefore, in 1936 formed the Associated Cement Company, now the largest producer in India, with the following objectives: (1) to organize sales most advantageously; (2) to regulate production in relation to demand for effecting economies in production and distribution costs; (3) to improve the industry by developing production in suitable localities; and (4) to control production in unsuitable areas.

In 1936 plants were started by the Dalmia interests in various parts of the country. This group maintained that cement could be produced more cheaply, thereby increasing consumption. Other plants also started up, and there was destructive price competition. Just before World War II the productive capacities were as follows: 1,860,000 long tons annually for Associated; 560,000 tons for Dalmia; and 360,000 tons for the others. Associated and Dalmia have now compromised, and consumption and production have since increased steadily, resulting in high profits for the industry.

View showing the 60,000 ton-per-year plant of the Banmor Cement Works which is located on the G.I.P. Railway between Delhi and Bombay.

Associated *The Banmor Cement Works* are situated near Banmor Station on the G.I.P. main line from Delhi to Bombay. The plant was started in the early twenties with a capacity of approximately 40,000 tons per year with a single kiln. This kiln was extended at a later date, and the present production is 60,000 tons per year. The kiln is equipped with a separate ro-

Bird's-eye view of the Bhupendra Works situated at the foot of the Simla Hills, five miles from the Kalka Station of the East Punjab Railway.

tary cooler. The quarries are situated at a distance of approximately 40 miles from the works, and the limestone is transported over the state railway.

No clay is required in the manufacturing process. The limestone is crushed in a gyratory crusher with a secondary hammermill. Compound tube mills are used for grinding raw materials and finished cement. These are the same size, being 1.75 m. dia. by 11 m. long. Coal is ground in a 1.75-m. by 6-m. coal mill provided with a rotary drier. Cement is at present packed in vacuum-type Exilor packing machines, but a four-spout Darnley Taylor packing machine is being installed for packing the cement into valve bags.

The plant has a workshop, as well as a cast-iron foundry for maintenance and manufacturing spares and grinding media.

In Associated's various plants a large number of the employees are housed by the works and the usual amenities such as a club building, a canteen, free housing, electric lighting, sanitation, welfare, and hospital, etc., are provided. Benefit facilities and free medical aid are also available.

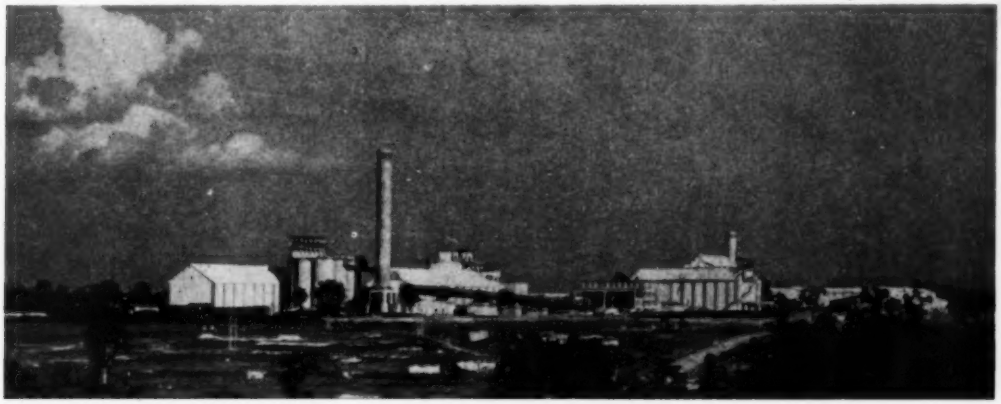
The Bhupendra Works are situated at the foot of the Simla Hills, 5 miles from the Kalka Station of the East Punjab Railway. The plant was started in 1938 as a single-kiln plant with a capacity of 108,000 tons per year. It was extended to 208,000 tons per year in 1949. The present plant consists of two 300-ton rotary kilns with integral coolers, two mills 2.2 x 12 m. and two mills 2.2 x 13 m. for raw and cement grinding, two airswept coal mills, and one traveling overhead grab crane for handling materials. The slurry storage consists of six vertical slurry silos, together with a mixer basin; and there are two cement silos with a capacity of 3,500 tons each. Cement is packed by means of a four-spout J. Darnley Taylor packing machine. The quarry is situated in the limestone hills at Malla, 6½ miles from the works. The stone is crushed at the quarry by means of a swing hammer crusher and transported to the works by means of an aerial ropeway.

The power plant consists of two turbo-alternators of 4,200 kw. and 2,600 kw. capacity and two Vitcovice water tube boilers rated at 18,000 lbs. per hour. Another boiler of 35,000 lb.-per hour capacity (Babcock & Wilcox) is under erection.

The plant is being further extended by additional 100,000 tons per year. Under this extension one more 300-ton rotary kiln, together with one air-swept coal mill, two 2.2 x 12 m. grinding mills, and a second overhead traveling grab crane are being installed. Duplicate cement storage and packing plant are also being constructed. This second packing plant will house two four-spout J. Darnley Taylor packing machines. Arrangements are also being made for dispatching cement in bulk.

The Chaibasa Cement Works, situated in the Province of Bihar, started production in 1947 with a capacity of 100,000 tons, and the plant was duplicated in 1949. These works are at present producing 200,000 tons of portland cement per year using the wet process.

It is a point of particular interest



The Chaibasa Cement Works, situated in the Province of Bihar, is at present producing 200,000 tons of portland cement per year via the wet process.

The Lakheri Cement Works, situated on the main B. B. & C. I. Railway Line from Bombay to Delhi, is at present producing 225,000 tons per year.

that these works, which were started during the war, are the first cement works in India for which the entire cement-making machinery was manufactured in Indian workshops, namely, the workshops attached to the various A.C.C. works. At present the A.C.C. workshops at Shahabad, Lakheri, and Madukkarai supply the main needs of cement machinery of the entire A.C.C. group. Limestone is quarried at the rate of 1,200 tons per day and transported to the crushing plant in self-emptying wagons hauled by steam locomotives. High explosives are used for preliminary blasting and pneumatic drills for secondary blasting.

One hammer crusher (2 x 1.8-m.) driven by a 250-hp. motor crushes the stone to 1-in. size in one operation. Grinding of slurry and finished cement is accomplished by two mills, 2.2- x 12-m., driven by 800-hp. coaxial gear boxes and motors.

The plant has two rotary kilns, 3 x 2.7 x 114-m., with integral coolers and heat exchanging chains in the slurry drying zone. The kilns have a capacity of 300 tons per day each and are fired by pulverized coal from an airswept coal mill.

Bates and J. Darnley Taylor packing machines are used for packing cement in six-ply paper bags and jute bags of 112-lb. gross weight.

The plant generates its own power by means of one B.T.H. steam turbine (4,000 kw. at 3,300 v.) and two John Thompson boilers (35,000 lb. of steam per hour at 310 p.s.i.).

The plant has a workshop for the maintenance of the mechanical and electric equipment. There is also a pattern shop and a foundry for the manufacture of spare parts, grinding media, etc.

Duplication of the plant was completed in 1949. The mechanization of the quarry and the packing house and the installation of a new coal-handling plant are a few of the important schemes which are under way.

Dwarka Cement Works, located at the western tip of India, 20 miles south of the Port Okha, went into production in 1921. The original capacity of the works was 100,000 tons per year, and the plant was later modified and extended to its present capacity of 180,000 tons per year.

The present plant consists of three rotary kilns with integral cooler, four raw mills, three cement mills, two coal mills and a wash mill. A scheme of extensive modernization and further extension is under way. Under this plan, a new clinker-handling plant, new slurry silos, a new kiln chimney, new cement silos and a packing plant are being constructed; three new 800-hp. cement mills are being installed and the existing raw mills are being modernized. Two four-spout J. Darnley Taylor packing machines are also proposed to be installed for packing cement into valve bags. When the modernization is completed, the capacity of the works will be 230,000 tons per year.

Fine calcareous sea-sand available on the local sea coast and clays available locally constitute the raw materials. There is, therefore, no limestone crushing plant at the works. One ¾-cu. yd. Northwest dragline is employed for excavating and loading calcareous sand and another similar dragline is shortly expected.

The power plant consists of two "Stal" Turbines, *viz:* one 3,000-kw. and one 1,350-kw.; two Babcock & Wilcox boilers; and one "Vitcovice" boiler with a capacity of 18,000 lb. per hour each. For power generation, as well as for firing kilns, a changeover from coal to furnace oil as fuel was made in 1947.

In this district the climate is particularly unfavorable because at the prevailing high wind velocities the air carries not only moisture but fine sea water spray. This causes extensive corrosion which has to be continuously combated. Besides, the hygroscopic nature of this salt-laden air causes rapid loss of insulating properties in the electrical apparatus. This makes it necessary to uncouple machines when idle and to keep the electrical motors running light.

The major portion of the production is dispatched in ships and small sailing vessels called country-crafts to the west coast of India, while the balance is dispatched by rail to the interior.

The Khalari Cement Works are located on the loop line Gomole-Dehri-on-Sone, of the East Indian Railway about 284 miles from Calcutta. The works commenced production in 1936 with a capacity of 100,000 tons per year.

In view of the quality of raw material now available, a proposal for enriching the limestone by flotation process is under consideration.

The plant consists of a swing hammer crusher for crushing limestone, two mills (2.4 x 12 m.) for grinding of slurry and cement, six R.C.C. silos for slurry storage, one 300 ton-per-day rotary kiln with integral cooler, one airswept coal mill and one overhead grab crane for handling materials. The cement is transported to the packing plant by means of a pneumatically-operated Fluxo transporter pump. There are two cement silos, each with a capacity of about 3,500 tons, and the cement is packed by means of an automatic rotary packing machine.

The power plant consists of two 2,000-kw. Brown Boveri steam turbines and three Babcock & Wilcox boilers rated at 15,000 lb. per hour each.

The Kistna Cement Works, Mangalagiri, are located near Vijayavada (South India) and are favorably placed for distribution of cement throughout the Madras Province by meter-gauge and broad-gauge systems of the M. & S. M. Railway and by boats through various canals.

The plant was started in 1939 with a capacity of 90,000 tons per year. Facilities consist of one 260-ton rotary kiln with integral cooler, two 2.2- x 11-m. mills for raw and cement grinding, one airswept coal mill, one swing-hammer crusher for crushing limestone, and one over-

The four kilns of the Madukkarai Cement Works, one of the largest and most modern cement plants in India.

head grab crane for crane gantry. There are four R.C.C. silos, one mixer basin for storage of slurry, and two R.C.C. silos, each of 3,500 tons' capacity, for cement storage. The cement is packed into valve bags by means of a four-spout J. Darnley Taylor packing machine.

The power plant consists of one 2,600-kw. "Stal" turbine and two "Vitcovice" boilers, each with a capacity of 18,000 lb. per hour.

The limestone is supplied to the works from two quarries, one situated about 6 miles from the works and the second 58 miles from the works. The limestone is transported in cars by special trains. The coal supplies are from collieries in Bengal, the Central Provinces and Hyderabad. The gypsum is obtained from the mines at Trichinopoly, South India.

The Kymore Cement Works are located in Jubbulpore District in the former Central Provinces (now Madhya Pradesh) on the Great Indian Peninsula Railway line between Bombay and Calcutta. This is the largest plant in India, producing 350,000 tons of cement per year.

The factory was established in 1922 as a two-kiln plant with a capacity of 100,000 tons of cement per year. These kilns are equipped with rotary clinker coolers. One further kiln with integral cooler was installed in 1928, raising the capacity to 180,000 tons per year. All three kilns were extended later on, raising the capacity of the works to 250,000 tons per year. Two kilns are of 210 tons each, while the third one has a capacity of 320 tons per day. A fourth large kiln with a capacity of 350 tons of clinker per day was installed in 1948, increasing the plant output to 350,000 tons per year. There are three airswept coal mills in commission. The clinker is conveyed by two 30-in. shaking conveyors recently installed, each capable of handling the output of all the four kilns at a time. The cement grinding capacity of the plant is about 1,300 tons per day. The cement grinding department consists of one 2.2- x 12-m. mill, one 2.2- x 11-m., and four 1.75- x 11-m.

The cement ground by the mills is conveyed by an inclined rubber belt conveyor to three R.C.C. silos, each with a capacity of 3,500 tons. Two four-spout Darnley Taylor packing machines have been recently installed in the packing house with a view to increase the packing and loading capacity and to mechanize the packing and loading operations.

There is a large repair shop with an attached foundry which turns out a fair quantity of wearing parts, grinding media, and machinery parts.

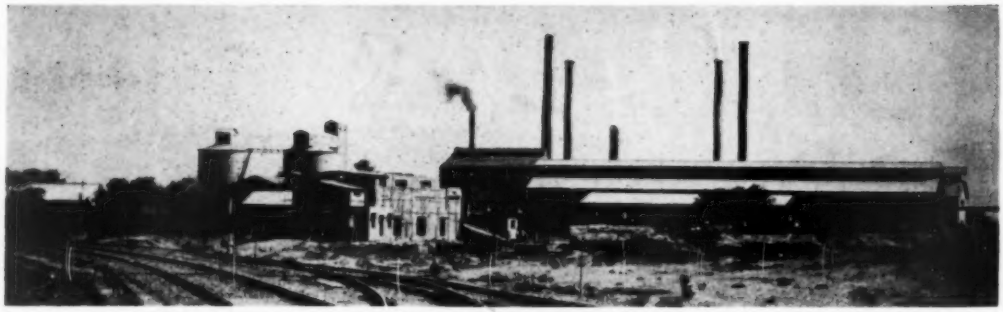
Limestone is transported to the works in tipping wagons of 12- to 15-ton capacity, hauled by steam locomotives. The clay is transported in 1-ton tipping tubs hauled by diesel locomotives.

Mechanization of the quarries has been recently undertaken, and four 1½-cu. yd. P & H electric excavators will be shortly put into commission. The crushing plant consists of two hammer crushers—one 1,600- x 1,200-mm. hammermill, one 2,000- x 1,800-mm. hammermill, and two gyratory crushers. The raw-grinding department has five raw mills, *viz:* one 2.2- x 12-m., the second 2.2- x 11-m., and the three mills each 1.75- x 11-m. The slurry is stored in three planetary mixer basins, and one additional mixer basin is being constructed.

The power requirements of the plant are met by two steam generators, one 6,000-kw. "Stal" set and

View of the Porbandar Cement Works' limestone quarry, located 12 miles from the plant at Porbandar in the state of Saurashtra.

Quarters for the unskilled laborers at the Rohri Cement Works, located in the Sind Province of West Pakistan.



This three-kiln plant of the Shahabad Cement Works is producing approximately 240,000 tons of cement per year.

one 3,750-kw. Metro-Vick set. The turbines are fed by steam from six Babcock & Wilcox boilers.

Additional new plant is being installed for mechanizing the storage and handling of coal.

The Lakheri Cement Works are situated on the main B.B. & C.I. Railway Line from Bombay to Delhi. The plant was started in 1914 as a hydraulic lime plant, with eight vertical lime kilns. Cement manufacture was started in 1917. The capacity of the existing works is 225,000 tons per year. The present plant consists of the following: two wet-process kilns (one with a waste-heat boiler) producing a total of 700 tons of clinker per day; two 2.2- x 12-m. raw mills; one gyratory crusher with hammermill in series for crushing limestone; two Edgar Allen 450-hp. cement mills; two cement grinding units, each consisting of Kominor and tube mill; one airswept coal mill; one tube mill for coal grinding, with rotary drier; and one 5-ton overhead traveling grab crane. Two four-spout Darnley Taylor packing machines have been provided for packing cement into valve bags.

The capacity of the works is being extended by 125,000 tons per year by the installation of a 300-ton-per-day kiln, two 2.2- x 12-m. cement mills, one 2.2- x 12-m. raw mill, conversion of the second coal mill into an airswept coal mill, extension of the short kiln, and provision of a second grab crane.

The power plant consists of two John Thompson boilers rated at 35,000 lb. per hour each; one 60,000-lb.-per-hour Babcock & Wilcox boiler; one 6,000-kw. "Stal" turbine and one 3,500-kw. B.T.H. turbine.

The limestone deposit at Lakheri consists of natural cement rock. The old quarries near the works have now petered out and fresh deposits a couple of miles away are being developed. Steps are being taken to mechanize the quarries.

There is a big workshop where compartment tube mills, feed tables, screw conveyors, belt conveyors, and other equipment required for the A.C.C. group is manufactured. So far, this workshop has manufactured eight 2.2- x 12-m. mills.

The Madukkarai Cement Works, Madukkarai, are situated about 7 miles away from Coimbators, South India, and are today one of the largest and most modern cement works in India.

Started in 1934 as a single unit plant with a capacity of 60,000 tons per year, the factory was extended in 1936 and again in 1942 to a total capacity of 180,000 tons per year. Further extension by 100,000 tons per year has been recently completed. The latest expansion consists of the following: a hammermill, a raw mill, a cement mill, a Fluxo transporter, a 350-ton kiln with integral cooler, an airswept coal mill, an overhead grab crane, and two J. Darnley Taylor four-spout packing machines. All the cement machinery except the packing machines were manufactured in the various workshops of the A.C.C.

The limestone quarry is about one mile from the plant and is reached by a 5-ft. 6-in. gauge track on which stone is transported in 8-ton trucks hauled by electric locomotives. The quarry is being mechanized with winches, Bucyrus shovels, and pneumatic drills. Clay required for mixing with limestone is obtained from local ponds which dry in the summer. The clay is transported to the plant by lorries and bullock-carts.

The present plant consists of three hammermills; one wash mill; three raw mills; three cement mills, each 2.2- x 12-m.; six connecting silos; a slurry mixer basin with a revolving gantry; two overhead traveling grab cranes; four rotary kilns with integral coolers; three airswept coal mills; five cement storage silos; and two four-spout packing machines.

Electric power is delivered at 22,000 v. to the works from the substation of Government Hydro-Electric Supply.

The Madukkarai works also manufacture considerable cement machinery for the A.C.C. group of factories.

Porbandar Cement Works—The manufacture of portland cement in India commenced in 1913, when the Porbandar Cement Works were started under the name of the Indian Cement Co., Ltd., at Porbandar, in the present state of Saurashtra.

The plant is situated in the town of Porbandar and is about 12 miles from the limestone deposits. The plant operates on a dry process. The raw materials are first crushed and dried in rotary driers, after which they are taken to storage hoppers by means of belt conveyors and elevators. Preliminary grinding is done in two ball mills, and the final grinding is done in a tube mill. The dry slurry is fed to the mixing and storage silos, from which it is conveyed by elevators and belt and worm conveyors to two short rotary kilns. These are fired by pulverized coal. The kilns are provided with a Babcock & Wilcox waste-heat boiler and each has a rotary cooler.

The clinker is ground in a tube mill, and the cement is stored in storage bins from which it is packed into gunny bags. The cement is dispatched in railway wagons and also in country crafts.

The power plant consists of a 1,500-kw. Brown Boveri turbine, together with an auxiliary generator. The steam for the generating plant is supplied from the waste-heat boiler and another Babcock & Wilcox water-tube boiler. The present capacity of the works is 42,000 tons per year.

Rohri Cement Works—This factory is situated in the Sind Province of West Pakistan about a mile from the Rohri Station on the Main Karachi to Lahore line of the North-west Railway and nearest to the well-known Sukkur Barrage across

the River Indus. Construction of the works was started in 1937, and production commenced in November, 1938. The present capacity of the works is 90,000 tons per year.

The plant consists of one 1,500- x 1,200-mm. swing hammer crusher; two 2.2- x 11-m. raw and cement grinding mills; one 250-ton rotary kiln; one airswept coal mill; and one 5-ton traveling overhead grab crane for handling materials. The slurry storage consists of four vertical slurry silos, together with a mixer basin; and the cement storage consists of two cement silos, each of 3,500-ton capacity. The cement is packed in open-mouth jute bags at present. However, one four-spout J. Darnley Taylor packing machine is being installed for packing cement into valve bags of jute or paper.

Limestone is obtained from the company's quarries adjacent to the works. Sand and clay are also available in close proximity to the plant. Gypsum is obtained in part from the company's mines in the neighboring provinces of Baluchistan and in part from the Salt Range in the province of Punjab.

The power plant consists of one 2,600-kw. "Stal" turbo-generator set and two Vitcovice water-tube boilers with a capacity of 18,000 lb. per hour.

The Shahabad Cement Works, which were established in the early twenties, are situated on the main line (G.I.P.) between Bombay and Madras.

Originally the factory was started as a one-kiln plant with a production of 40,000 tons per year. It has been extended by enlarging the original kiln and by adding two more kilns; so the present capacity is approximately 240,000 tons per year.

The limestone quarries are situated at approximately 3½ miles from the factory site and are connected to the works by a 2-ft. 6-in. gauge trackline. The clay quarry is midway between the limestone quarries and the works and is served by the same track.

Limestone transported from the quarry is crushed in a swing hammer crusher of 100-t.p.h. capacity, while the clay is crushed in two small gyratory crushers with hammermills in series. Crushed raw material is elevated to the respective hoppers which serve the four wet slurry grinding mills, 1.75- x 11-m. Ample slurry storage is provided by means of four slurry silos, as well as planetary type mixer basin.

Two of the three kilns, which are 290 ft. long, are equipped with separate rotary coolers and have a capacity of approximately 170 to 180 tons of clinker per day. The third kiln, which has been recently extended to 408 ft., has Unax type cooler tubes and is capable of yielding an output of approximately 340 tons of clinker per day. The coal-

View of one of the kilns of the Wah Cement Works in Punjab, Western Pakistan.

grinding department consists of two 5-ft. 9-in. x 20-ft. 7-in. coal mills, each provided with a rotary coal drier, and one 2.2- x 7.4-m. airswept coal mill, recently installed.

There are four cement grinding mills, two being 1.75- x 11-m. and two 2.2- x 12-m., having a total grinding capacity of 900 tons per day.

The cement packing is done by means of two four-spout Darnley

Aerial view of the Wah Cement Works.

Taylor "Modern" packing machines, which can pack in jute bags as well as paper bags. Cement in bulk is also loaded for large customers.

The factory has its own power plant with an installed capacity of 5,000-kw.

A large workshop has been established by the A.C.C. at Shahabad for manufacturing rotary kilns, crushers, and other cement-making machinery. This workshop has so far manufactured five rotary kilns of 300-ton-per-day capacity.

Wah Cement Works, Wah (RS), District Attock in Punjab, Western Pakistan, was constructed in 1921-23 as a single-kiln plant with a capacity of 44,000 tons per year, and the plant output was doubled in 1928. Each unit consisted of a jaw crusher; a Kominutor and a tube mill for grinding wet slurry; a short rotary kiln with a rotary cooler; a coal mill; a cement grinding unit comprising a Kominutor and a tube mill; and a couple of vacuum type "Exilors" for cement packing.

The factory was further extended in 1937 to a capacity of 173,000 tons per year by installing a new plant producing almost as much as the above two units. This new plant consists of the following: a double swing hammer crusher; a screening plant; an overhead traveling grab crane; a 2.2- x 12-m. Unidan raw mill; a 250-ton rotary kiln provided with a grate cooler; a Rema coal mill; and a 2.2- x 12-m. Unidan cement mill.

Further expansion by 100,000 tons per year is under way. There will be a single swing hammer crusher; a second overhead grab crane; two 2.2- x 12-m. Unidan mills driven by 800-hp. gear boxes and motors; a 300-ton-per-day kiln, an airswept coal mill, 2.2 m. x 7.4 m.; and two four-spout J. Darnley Taylor packing machines. Provisions of oil-firing equipment is under consideration.

The limestone quarry is about 200 yards from the crusher, and the clay quarry is also nearby. Indigenous coal is available from a source about 100 miles away. Gypsum sources exist within a radius of 200 miles in varying qualities.

The works are situated on the main railway line and are approachable by a metalled road about 1½ miles from the main national highway. The factory, along with its residential colony, occupies an area of about 175 acres.

Severe winters and summers are experienced. The maximum temperature reached in summer is 120° F., and the minimum for winter is 32° F.

Most of the workers come from the surrounding villages. Skilled and semi-skilled workers are housed free in well-built hygienic houses equipped with electricity and water-borne sanitation.

(To be continued.)

Washington News

(*From page* 80)

to meeting defense and other essential needs and at the same time to help limit the use of credit for other purposes.

Accordingly the committee issues bulletins which contain recommended policy to achieve the desired objective. Adherence to the policy is entirely a voluntary act of the financing institution. However, substantial cooperation has been received, and the program appears to be securing results.

In its bulletin dealing with the Restriction of Business Capital Expenditure Financing, the committee had the following to say:

"Roughly half of the anticipated capital expenditures of business concerns during 1951 may be classed as defense or defense-supporting, with emphasis on the latter. Included in these categories are expansion of basic productive capacity in such manufacturing industries as steel, aluminum, and petroleum; additions to electric power-generating and transmission facilities; and the purchase of additional rolling stock by the railroads. Every effort should be made to assure availability of materials, equipment, and financing essential to the completion of these projects.

"On the other hand, approximately half of the capital expenditures planned by business for 1951 falls in a more or less indeterminate class so far as their relationship to the defense effort is concerned" . . .

"Since it may be difficult in individual cases to differentiate essential from nonessential capital expenditures, as well as those which it would be desirable to postpone in the interest of longer run economic stability, certain tests are suggested to financing institutions cooperating in the Voluntary Credit Restraint Program in making financing decisions. Among the nonessential uses of long-term financing that in the judgment of the committee might be postponed to a more propitious time are those for such purposes as:

"(1) Construction of facilities to improve the competitive position of an indivdual producer of nonessental goods.

"(2) Expansion and modernization expenditures of concerns in distribution or service lines where the distribution or services is not defense-supporting.

"(3) Expansion and modernization programs for the manufacture of consumer goods not related to the defense effort.

"Financing institutions are urged to give equal consideration to the needs of small as well as large business in screening applications for long-term financing."

This is the lending policy likely to be followed by most financing institutions in the near future. How well the admonition regarding small business will be obeyed still remains to be seen.

N.L.A. Convention

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situation was reversed as the young drift started and stayed lowest and the clay-gravel soil was best.

In concluding Professor Wood stated that the texture of the soil is an important variable, and so is also probably the chemical analysis. It is becoming more and more obvious that the length of curing time is important. The speaker believes that in cold areas lime-stabilized roads should be built early in the year. It is also becoming apparent that in all cases higher lime content and longer curing time are important. Professor Wood recommended that in the future tests be made with a revised dynamic modulus tester altered to use cylindrical specimens instead of beams. This instrument gives results which can readily be correlated, whereas the sonoscope is a costly instrument and difficult to build. Only 7 or 8 are now known to be in use.

Lehigh Expansion Program At Cleveland Plant Deferred

Officials of the Lehigh Portland Cement Company recently announced that plans for expanding the Cleveland plant's capacity have been postponed. A spokesman for the company stated that the "expansion program is not dead, but the company is building plants elsewhere and decided against spending any more time on the Cleveland plans . . ." at this time.

When the cement firm's officials announced a $3,000,000 enlargement program in February, civic groups registered opposition, citing a possible downtown dust nuisance and criticizing a proposed 106-ft. smokestack. Plans had been made to add facilities which would double the present output.

The Colorado Portland Cement Co. plant at Portland, Colo., produces 1,100,000 bbl. of cement annually.

An Examination of the Thermal Efficiency of the Rotary Cement Kiln

Proposals for Improvement

Published in Revue des Materiaux, October-December, 1949; translated and reviewed by B. M. Pearson, Hassocks, England.

By M. J. M. JASPERS

THE thermal efficiency of the cement kiln remains one of the dominant technical problems in cement making practice, exerting an important influence on the production cost of the cement and amounting to 30 to 50 percent of this cost, depending on the amount of fuel actually used.

In industrial practice, the fuel consumption can vary from 850 to 2,400 k. cal./kg. of clinker, according to the procedure applied and the thermal efficiency of the kiln, while the theoretical fuel consumption is 400 to 450 k. cal./kg. of clinker, which accordingly gives a thermal yield of 17 to 53 percent.

By virtue of these facts, the economic importance of thermal efficiency is apparent and the possibilities of inherent technical improvement in the burning process is clearly evident.

The efforts developed in this direction, both by the kiln designers and by cement manufacturers, have been multitudinous, varied in their nature, and often effective. Methods tried and adopted have included the following: progressive increase in kiln size and dimensions; recuperation of the calories carried away by waste gases to produce useful power; filtration and injection of the slurry; chain systems; separate preheaters (concentration, calcinator, evaporator), or even mounted on the kiln itself (Smidth, Vickers-Armstrong, Holderbank); the Lepol kiln; the electric kiln; the moving grate; the conveyor furnace; rotary or grate-type coolers; improvement in the firing effect and slurry viscosity; and flotation of the raw materials.

It will be fairly obvious that in proportion as the thermal efficiency of the kiln is improved, the attainment of further progress in this direction becomes continually more difficult, and that it becomes necessary to an ever-increasing extent, to have recourse to all the methods of investigation and research that science and modern technology have put at our disposal.

The object of the present survey is not only to make a systematic thermal study of the rotary cement kiln, but also review the various factors influencing the thermal efficiency of the kiln, and to appraise their relative importance. To this end we will consider successively:

(1) Losses of calorific (thermal) energy.
(2) Transmission of calorific (thermal) energy.
(3) Material to be fired, from the point of view of the thermal efficiency of the kiln.

For complete detailed information on the thermal efficiency of the rotary cement kiln, reference should be made, in conjunction with this present study, to a series of articles which previously appeared on this subject—"L'Etude de la Cuisson du Ciment au Four Rotatif", *Revue des Materiaux*, January to November, 1938.

PART I—LOSSES OF THERMAL ENERGY

Let us consider the system kiln-cooler in which thermal energy is developed and transmitted directly or indirectly to the material being processed. Since the material is solid, granular and heterogeneous it is submitted to determined chemical and physical transformations. The thermal energy not transmitted for this effect to the material escapes by way of the walls of the kiln and cooler, with the warm clinker which passes out of the cooler at the exit, or with the gases at the combustion exit of the kiln.

Losses through Kiln and Cooler Walls

The thermal energy escaping through the walls of the kiln and cooler is transmitted to the air at normal temperature, either by radiation or convection and is consequently governed by the laws applying to these types of heat transmission.

The heat loss through the walls of a cylindrical cooler without special recuperation arrangement being relatively low (several tenths of one percent of the coal at 7,000 k. cal. with respect to the clinker), there is no great point in taking any special measures to arrest this. In addition, modern clinker coolers with mechanical grates may render this loss quite insignificant.

As regards the kiln, the heat lost by the walls is more important. It can amount to 10 to 20 percent of the calories utilized per kg. of clinker, the percentage of calories lost increasing when the number of calories of clinker consumed per kg. during the burning diminishes.

The loss by radiation is the most important, being about 60 percent of the total loss; and this loss is caused principally (likewise to the extent of about 60 percent of the total loss), in the hot region of the kiln about one-third of the length of the kiln, on the lower side.

The problem which is now imposed is to ascertain whether there is any possibility of diminishing or of recuperating the calories lost through the kiln walls.

Attempts that have been made to prevent these calories from leaving the kiln by interposing a thermal insulating layer in the firing zone between the refractory lining brick and the outer metal casing have proved more or less futile up to the present time. There remains the other alternative: to capture the calories on leaving the metal casing of the kiln and to re-introduce them into the cycle.

One of the first ideas that was proposed in this direction, but which to the author's knowledge has not yet been realized practically, is that of preheating the combustion air by drawing it through the circular space created by the wall of the kiln and a concentric envelope.

It should first be mentioned that the secondary air is generally utilized to recuperate the calories carried away by the clinker; it is quite useless to abandon this recuperation merely in order to proceed with another one; this constitutes no actual technical progress.

There remains the primary air, generally about 30 percent of the total combustion air. If for any reason it is not preheated by drawing through the cooler, one can envisage its preheating by means of the calories lost by external conduction in the firing zone of the kiln.

A Typical Problem Let us use a calculated example to estimate the influence exerted on the thermal efficiency of the kiln by means of preheating the primary air with the calories lost by external conduction in the hot zone of the kiln.

A kiln of these dimensions will be considered: an enlarged zone, 3.2 meters in diameter and 20 meters long; 2-cm. metal casing; 12-cm. refractory brick; and 12-cm. layer of mortar.

The number of calories lost by the wall of the kiln can be calculated as follows:

$$Q_v = Q_v = \frac{(\Theta_1 - \Theta_2)\ L}{\frac{1}{2\pi}\left(\frac{1}{\lambda}\ln\frac{R_2}{R_1} + \frac{1}{\lambda'}\ln\frac{R'_2}{R_2} + \frac{1}{\lambda''}\ln\frac{R''_2}{R'_2}\right)}$$

= 1,250,000 k. cal./hour;

Q_v = k. cal./hour
L = length of the enlarged zone: 20 meters.
Θ_1 = average temperature of kiln wall at interior: 1,300 deg. C.
Θ_2 = average temperature of kiln wall at exterior: 300 deg. C.
λ = coefficient of thermal conductivity of the mortar: about 1.5.
λ' = coefficient of internal conductivity of Radex lining: about 3.5
λ'' = coefficient of internal conductivity of metal shell lining: about 40
R_1 = 1.30 meters
R_2 = 1.44 meters
R'_2 = 1.59 meters
R''_2 = 1.60 meters

These calories permit of heating to about 300 deg. C.

$$\frac{1{,}250{,}000}{0.318 \times 300^\circ\ \text{C.}} = 13{,}000\ \text{Nm}^3\ \text{air}$$

The velocity at which it is necessary to pass the air through the annular space will now be calculated:

$Q_v = k_c\ S\ (t - t')$
Q_v = 1,250,000 k.cal./hour
S = 200 m^2
t = average temperature of the kiln wall at exterior: about 300 deg. C.
t' = average temperature of air aspirated: about 150 deg. C.
$k_c = 2 + 10\sqrt{w}$
k_c = coefficient of convection: k. cal./m^2/hour/° C.
w = velocity of the air in meters/sec.

Then w = 16 meters/second, and the width of the annular section becomes: 22.5 cm.

Since only 10,000 Nm^3 of primary air is required (Nm^3 = 1 cu. meter of gas at 0 deg. C. and 700 mm. of Hg.), and it has been assumed that the secondary air is heated by the clinker, there remain available 3,000 Nm^3 of air, which can be utilized in other ways, for example, for drying the fuel.

The preheated primary air will carry:

10,000 Nm^3 × 0.318 × 300 deg. C. = 955,000 k. cal./hr.

which is 64 k. cal./kg. of clinker or $\frac{64 \times 100}{1{,}743} = 3.7$ percent of the calories consumed per kg. of clinker—an economy of 0.91 percent of fuel (cal. value 7,000 k. cal.) with regard to one ton of clinker.

In this case the economy results from the simple substitution of the calories carried by the preheated primary air for the calories which must be (without this preheating) developed by the combustion of the coal, the combustion temperature remaining the same.

Nevertheless, it can be asked, whether from the thermal point of view, it is not more interesting to increase the combustion temperature by means of the calories carried by the preheated primary air—inasmuch as the refractory lining will permit this.

To examine this possibility, the theoretical temperature of combustion will first be calculated with cold and preheated air:

Products of combustion = 9.18 Nm^3
Calorific power of the coal = 7,000 k. cal.
Specific heat of combustion products = 0.397
Kg. of clinker per kg. of coal = 4.05 (24.63 percent of coal)

Theoretical temperature of combustion, air preheated to 300 deg. C. $= \frac{7{,}000\ \text{k. cal.} + 64\ \text{k. cal.} + 4.05\ \text{kg. clinker}}{9.18\ \text{Nm}^3 \times 0.397}$

= 2.028 deg. C.

Theoretical temperature of combustion, air at 20 deg. C. $= \frac{7{,}000\ \text{k. cal.} + 4\ \text{k. cal.} + 4.05\ \text{kg. clinker}}{9.18\ \text{Nm}^3 \times 0.397}$

= 1,960 deg. C.

This gives a difference in the combustion temperatures of 68 deg. C.

It can be assumed that between the actual real combustion temperatures there exists approximately the same divergence, according to whether the primary air is preheated or not.

Now in the firing zone the heat transmission is effected almost entirely by radiation, and this is a function of T^4, as regards the heat radiated by the particles of incandescent carbon towards the walls and the material, while it is a function of T for the heat radiated by the CO_2 gas and the water vapor.

Now let us calculate the effect of an increase of 68 deg. C. in the actual combustion temperature on the transmission of calories in the combustion zone.

For this purpose we shall use as the basic figures the results of the measurement obtained by Gygi[1] on a kiln 71.45 meters in length, wet process (34 percent H_2O in the slurry), producing 8.5 tons of clinker per hour, with 1.45 k. cal./kg. of clinker, and temperature of waste gases at the kiln exit, 226 deg. C.

The heat transmitted to the material in the combustion zone, per running meter in length, is distributed as follows:

Q radiation gas/material (Q_{RGM})	330,000 k. cal./m./hr.
Q radiation coke/material (Q_{RCM})	428,000 k. cal./m./hr.
Q radiation wall/material (Q_{RPM})	499,000 k. cal./m./hr.
Q convection gas/material (Q_{CGM})	15,000 k. cal./m./hr.
Q conductivity wall/material ($Q_{c'PM}$)	259,000 k. cal./m./hr.
	1,531,000 k. cal./m./hr.

The temperatures of the gas, wall, and material were as follows:

Average temperature of gas, t_G = 1,845 deg. C.
Average temperature of wall, t_P = 1,330 deg. C.
Temperature of the material, t_M = 901 deg. C.

It will now be assumed that t_G is increased by 68 deg. C. Then:

t_G = 1,845 deg. C. + 68 deg. C. = 1,913 deg. C., t_P and t_M remaining the same respectively at 1,330 deg. and 901 deg. C.

[1] H. Gygi, *Waermetechnische Untersuchungen des Drehofens zur Herstellung von Portlandzementclinker.*

Under these conditions, for $t_G = 1{,}913°$ C., Q_{RGM} becomes the product of the partial pressures of CO_2 and H_2O for the thickness of the gaseous layer:

$^cCO_2 = 0.23$

$^cH_2O = 0.07$

and

$^qCO_2 = 47{,}200$ k. cal./m.²/hour;

$^qH_2O = 58{,}000$ k. cal./m.²/hour

$Q_{RGM} = 105{,}200$ k. cal./m.²/hour

$F_M = 3.67$ m.², surface of the material per running meter of kiln;

$Q_{RGM} = 105{,}200 \times 3.67 = 387{,}000$ k. cal./meter/hour

Q_{RGM} becomes: $0.3651 \times 2.284 \times$

$$4.70\left(\frac{(2{,}425)^4}{100} \times 0.922 - \frac{(1{,}174)^4}{100} \times 0.759\right)0.417$$

$= 490{,}000$ k. cal./meter/hour

Q_{RGM} becomes:

4. 41 (1,913 —901) 3.67 = 16,400 k. cal./meter/hour. Q_{RPM} and Q_{CPM} remain unchanged because it has been assumed that t_M and t_P have the same values for $t_G = 1{,}845$ deg. and 1,913 deg. C.

The following table covers for $t_G = 1{,}845$ deg. C. and 1,913 deg. C., the result of the calculations relative to the distribution of the calories transmitted to the material:

$t_G = 1{,}845$ deg. C.	$t_G = 1{,}913$ deg. C.
$Q_{RGM} = 330{,}000$	387,000 k. cal./meter/hour
$Q_{RCM} = 428{,}000$	490,000 k. cal./meter/hour
$Q_{RPM} = 499{,}000$	499,000 k. cal./meter/hour
$Q_{CGM} = 15{,}000$	16,400 k. cal./meter/hour
$Q_{C'PM} = 259{,}000$	259,000 k. cal./meter/hour
1,531,000	1,651,000 k. cal./meter/hour

The difference is: 120,400 k. cal./meter/hour, which is an increase of 7.8 percent with regard to the calories transmitted at 1,845 deg. C.

This is equivalent to saying—because here it is a question of entropies at high thermal potential—that increasing the true combustion temperature by preheating the primary air by means of the calories lost through external conduction through the kiln wall in the firing zone, can effect an economy in fuel and an increase in production of 7.8 percent.

From these theoretical considerations, it seems much more interesting, from the point of view of the thermal efficiency of the kiln, to utilize the calories recuperated by preheating the primary air to increase the ruling temperature, than simply to add them to the calories developed by the combustion of the coal.

These considerations lead equally to the interest of technicians in control of combustion temperatures, by means of pyrometers, with the object of maintaining such temperatures at a constant figure and at the maximum.

Finally, it will be recalled that the starting point of the above thermal calculations was the recuperation of the calories lost through the kiln wall, by drawing the primary air through the annular space between the wall and a concentric envelope in the firing zone.

From the practical aspect the system offers the inconvenience that the envelope prevents the inspection of the kiln wall in cases where it attains a red heat. The author considers, however, that this inconvenience can be remedied by installing thermo-electric or photo-electric detectors which actuate visual or oral signals.

The realization of this envelope around the firing zone of the kiln can be conceived according to differing variants, in such a way as to obtain the most methodical circulation of the air aspirated around the kiln. This will be dealt with later. To sum up, only experience can permit of determining which among these variants proves to be the most appropriate.

Thermal Energy Loss by Clinker The clinker leaves the firing zone at a temperature of about 1,450 deg. C.; theoretically (and also practically with clinker coolers of the mechanical grate type) it can be cooled to normal temperature, about 50 deg. C.

Between 50 deg. C. and 1,450 deg. C. the average specific heat of the clinker is 0.26. Accordingly, a kg. of clinker removes:

$0.26 \times 1{,}400$ deg. C. = 368 k. cal.

With the mechanical grate clinker coolers (Fuller and Smidth) the losses by radiation are insignificant; one can accordingly, in principle, recuperate almost the whole of the calories of the clinker by the combustion air.

From the point of view of economy (fuel consumption and production), it resolves into a question of heating the minimum amount of combustion air to the maximum temperatures, rather than of recuperating the last calorie of clinker. In the case of the kiln considered, 8.95 Nm³ of combustion air are required per kg. of coal and 24.63 percent of coal per ton of clinker, which gives 2.2 Nm³/kg. of clinker, for combustion air.

It is this 2.2 Nm³ of combustion air which must be raised to the highest possible temperature through recuperation of the clinker heat, by placing it in contact with the incandescent clinker; this being realized, there will remain a certain number of calories of a given thermal potential whose recuperation is interesting only inasmuch as it is necessary to safeguard the clinker handling equipment; and their thermal potential or temperature should be high enough to utilize the air thus preheated, for example for the drying of the fuel. Moreover, this is the basis and the theoretical justification of mechanical grate clinker coolers.

Thus, with clinker coolers of the mechanical grate type, the secondary air is heated to about 550 deg. C., the primary air passing to the coal grinder at about 330 deg. C., while the final cooling air for the clinker, blown to the atmosphere, reaches about 80 deg. C., the clinker being cooled to about 50 deg. C.

The calculation of the theoretical combustion temperature with the air unheated and of the secondary air preheated to 550 deg. C. shows the importance of the recuperation of the thermal calories present in the hot clinker.

2.2 Nm³ of combustion air /kg. of clinker

2.2 Nm³ $\times$ 0.7 = 1.54 Nm³ secondary air /kg. of clinker

1.54 Nm³ secondary air $\times$ 0.323 $\times$ 550 deg. C. = 265 k. cal./kg. of clinker

$$24.63 \text{ percent of coal} = \frac{100}{24.63} = 4.05 \text{ kg. clinker/kg. of coal}$$

$265 \times 4.05 = 1{,}070$ k. cal./kg. of coal, recuperated on the clinker.

T_{th} combustion, air preheated to 550 deg. C.:

$$\frac{7{,}000 \text{ k. cal.} + 1{,}070 \text{ k. cal.}}{9.18 \text{ Nm}^3 \text{ waste gas} \times 0.397} = 2{,}210 \text{ deg. C.}$$

T_{th} combustion, unheated air at 20 deg. C.:

$$\frac{7{,}000 \text{ k. cal.} + 16 \text{ k. cal.}}{9.18 \text{ Nm}^3 \text{ waste gas} \times 0.397} = 1{,}930 \text{ deg. C.}$$

Difference: 280° C.

It will be assumed as the first approximation that the same difference exists between the actual temperatures of combustion as between the theoretical temperatures of combustion.

As in the previous case we can suppose in the first place, that with the preheated secondary air the same ruling temperature is maintained as with the cold air. In this case the thermal economy will be:

$$\frac{265}{7{,}000} \times 100 = 3.8 \text{ percent coal (calorific value 7,000 k. cal.)}$$

with regard to the clinker.

Another hypothesis can similarly be visualized on the basis that the actual combustion temperature is increased by 280 deg. C.; in this case, one would achieve a better heat transmission, increased production, and reduced fuel consumption.

It has already been calculated that an increase of the real combustion temperature by 68 deg. C. would effect an economy in the fuel and an increase of production of 7.8 percent. An increase of the combustion temperature —if this were possible—by 280 deg. C. would cause a still more important improvement in the thermal efficiency of the kiln.

It must be assumed, however, that an increase of 280 deg. C. of the actual combustion temperature is not normally possible in the cement kiln. In fact, according to Gygi's measurements,[2] at a gas temperature of 1,845 deg. C. this would correspond to a flame temperature of 2,084 deg. C. in the firing zone.

Now, with air as the combustion agent, the maximum temperature which can be achieved is 2,000 deg. C. to 2,100 deg. C. Above this, an increase in temperature is counteracted by the dissociation of CO_2 and H_2O, while at 2,000 deg. C. this is still low—7.5 percent for CO_2 ($P = 1$ atmosphere).

But in reality, even without being able to carry the ruling temperature to 2,210 deg. C. (although theoretically this would permit the preheating of the secondary air to 550 deg. C.), because of the dissociation of CO_2 and H_2O, one could realize the theoretical economy which would result from an increase in the combustion temperature to 2,210 deg. C.

Although, in fact, it is true that the dissociation prevents the temperature from exceeding a certain limit, nevertheless, the calories absorbed by the dissociation are restored in proportion as the heat is transmitted to the material and to the walls; and thus the temperature has a tendency to drop. This is equivalent to saying that due to the preheating of the secondary air, the combustion zone is prolonged.

As a consequence, the productive capacity of the kiln is increased and the fuel consumption is decreased, since prolonging the firing zone signifies, in this case, prolonging the zone of the transmission of calories at a high thermal potential.

These considerations lead to the conclusion that, from the point of view of the kiln construction, it is sound technical practice to develop a kiln with a large diameter, or a sufficiently long enlarged zone.

Thermal Energy Loss by Waste Combustion Gases

This loss is by far the most important. In analyzing the losses of calories by waste gases it must be stated that waste gases are constituted essentially of the products of combustion—the CO_2 of the carbonates and the H_2O of the slurry.

Most of the calorie loss through waste gases results from the heating and evaporation of the water in the slurry; they are practically irrecuperable, because it is not possible to allow the water vapor in the waste gases to condense. This fact indicates the importance of working with the minimum of water in the slurry.

As regards the remaining calorie loss by waste gases, it is constituted by the sensible heat of the waste gases and, as a consequence, is a function of the waste gas exit temperature.

Example of Thermal Balance

It is not the intention here to run through all the calculation of the thermal balance of a cement kiln. A typical example will be taken, borrowed from normal industrial practice, in which

H_2O in slurry = 40 percent
t^o waste gases = 225 deg. C.
t^o clinker = 300 deg. C.
kg. of H_2O/kg. of clinker = 1.02
Nm^3 waste gas volume per kg. of clinker = 2.5
Nm_3 CO_2 from carbonates per kg. of clinker = 0.27
k. cal./kg. of clinker = 1,743

	k. cal./kg. clinker	%
1. Evaporation of H_2O: 1.02 kg./kg. of clinker at 15 deg. to 100 deg. = 85 k. cal./kg. of H_2O × 1.02	= 87	5.0
Heat of vaporization: 533 k. cal. × 1.02	= 545	31.0
Sensible heat: 100 deg. to 225 deg. C. ($C_s = 0.465$) 58 k. cal. × 1.02	= 59	4.0
	691	40.0
2. Calories carried away by dry waste gases: Combustion: 2.5 Nm^3/ kg. of clinker		
CO_2 slurry: $\frac{0.27}{2.77}$ Nm^3 × (225 deg. — 15 deg.) = 210 deg. × 0.38	= 220	12.5
3. Calories carried away by clinker: 1 kg. (300 deg. — 15 deg. C.) = 285 deg. × 0.24	= 68	4.0
4. Clinkerization:	450	25.5
5. External conduction and undetermined:	314	18.0
	1,743	100.0

It will be seen that 52.5 percent of the total number of calories are removed by moist waste gases; 40 percent by the water of the slurry, and 12.5 percent by the products of combustion and decarbonation.

Further consideration shows that of the 220 k. cal. removed by the products of combustion and decarbonation, leaving the kiln at 225 deg. C., there is still a relatively important recuperation to be realized.

Assuming that the exit temperature can be successfully lowered to 150 deg. C., there will be recuperated:
220 k. cal.— [2.77 Nm^3 × (150 — 20 = 130) × 0.38]
= 83 k. cal./kg. clinker,
which is 1.2 percent of coal (cal. value 7,000 k. cal.) on the clinker.

83 k. cal./kg. clinker, which is 1.2 percent of coal (cal. value 7,000 k. cal.) on the clinker.

As regards the calories removed by the water vapor originating from the slurry, there is hardly anything to recuperate since 90 percent of the calories are necessary to heat and evaporate the liquid water, and are consequently irrecuperable.

Hence, if it is desired to diminish the losses of calories

[2] Ibid.

removed by the waste gases, it is necessary above all to diminish the amount of water in the slurry.

The content of water in the slurry can vary normally from 32 to 44 percent, according to the nature of the raw materials and the fluidity desired.

The problem of the diminution of the water content in the slurry raises questions of colloidal chemistry because of the smallness of the clay particles. These belong to the class of electrolytic colloids, which means that they exist only in colloidal solution if the core of the granule of the particle is surrounded by a double layer condensed and diffused.

The addition of electrolytes modifies the pH of the clay slurries and, as a consequence, also the viscosity, the one varying inversely with the other. The viscosity of the slurries is diminished by utilizing monovalent cations as counter-charges or opposing ions to the OH^- ions of the layer absorbed by the core and by rendering the dispersive phase (in this case, the water) lightly alkaline by a low excess of anion OH^-.

The unfavorable influence of the soluble salts of the clay can be neutralized by insolubilizing them by the addition of adequate cations, for example Ba^{++}, in the case of sulphates or of soluble carbonates.

Results similar to those obtained with inorganic electrolytes are obtained with organic substances modifying the surface tension of water.

The theme is too lengthy to pursue in this review. It is also impossible to develop in detailed length the theoretical aspect of the problem of slurry fluidization by the addition of electrolytes and surface tension-active agents.

It will suffice to state here that, according to the nature of the raw materials, the author has confirmed diminutions of the water in the slurry from 45 to 40 percent, from 36 to 28 percent and from 42 to 38 percent by adding a quantity of Na_2CO_3, approximately 0.5 percent per ton of clinker.

To fix our ideas on the subject, let us calculate the eventual interest, from the thermal aspect, of a diminution of 5 percent of the water in the slurry.

A slurry with 40 percent H_2O contains 1.035 kg. of water per kg. of clinker; the same slurry with 35 percent of water will contain only 0.840 kg. of water per kg. of clinker, which is a difference of 1.035 — 0.840, or 0.195 kg. H_2O per kg. of clinker.

To evaporate 1 kg. of water and to raise it to 300 deg. C., 712 k. cal. are required, which results in an economy of 1.9 percent of coal of 7,000 k. cal. value with respect to the clinker, or 133 k. cal. per kg. of clinker.

In reality, the economy in fuel will be a little less, because the temperatures of the waste gases at the exit from the kiln increase in proportion as the water content is reduced in the slurry. Consequently it will be advisable in such a case to reinforce the recuperative system for the heat.

It results from the examination of the three sources of loss of thermal energy in the rotary cement kiln—walls, clinker, waste gases—that the recuperation or the systematic reduction of these calories can appreciably improve the thermal efficiency of the rotary kiln.

We have learned the practical importance of the control of the combustion temperature, of the efficiency of the clinker cooler, of a kiln with an enlarged zone, and of the diminution of water in the slurry.

(*To be continued*)

Modernization at Louisville

(*From page* 95)

about ten times as much portland cement as the original installation.

In 1917, Louisville became one of the first companies in the country to undertake the manufacture of masonry cement for wide distribution. Today its rotary kiln plant at Speed for the production of Brixment masonry cement is one of the most modern in the industry.

In 1871, at Utica, Ind., the company acquired its first plant for the production of lime. This site was abandoned in 1885, and the facilities were moved to Milltown, Ind., where the company today operates a modern lime and crushed stone plant. Another wholly-owned subsidiary, Louisville Cement Co. of New York, operates a Brixment plant at Akron, N. Y.

In 1919 the company instituted a general civic improvement program at Speed for the benefit of its employees and their families. Outgrowths of this far-sighted policy are today evident in a well-equipped community building with a full-time director, and a year-around program of educational and recreational activities, all sponsored and financed by the management. When a 30-year club was organized several years ago, the effectiveness of this broad program was indicated by the discovery that 124 employees were eligible for membership. Many of the present employees have worked for the company for over 50 years.

Officers of the Louisville Cement Co. are W. S. Speed, chairman of the board; E. D. Hill, president; R. K. Hartsock, vice-president and production manager; John H. Mallon, vice-president; Homer L. Baker, sales manager; Roland Whitney, secretary; and B. F. Martin, vice-president and treasurer. Thomas McDonald is chief engineer, Dr. Eugene J. Wechter is research chemist, and Wallace Leach is chemist.

Lehigh to Produce Cement From Coquina Clam Shells

Cement from coquina clam shells will be in production at Flagler Beach, Fla., by mid-1952, when the Lehigh Portland Cement Company's $11,000,000 plant there begins operations.

The beach, located about 80 miles south of Jacksonville, contains extensive deposits of coquina clam shells. There are three ridges in the deposit 60 ft. deep, 800 to 1,000 ft. wide, and six miles long.

Giant Portland Cement Co., Philadelphia, Pa., announced a net income of $827,538 on net sales of $5,509,787 for the twelve months ending March 31. This compared with $480,799 on sales of $4,619,756 for 1950-51.

Dodge Notes Sharp Rise In Construction Totals For May, 5-Month Period

Construction contracts awarded in the 37 states east of the Rockies during May showed marked gains over April and were substantially ahead of May, 1950, it was announced by F. W. Dodge Corporation. The May figure for the 37 states was $2,572,961,000, or 87 percent above that of the previous month and 91 percent more than May a year ago.

The volume in the first five months of 1951 was also ahead of that for the corresponding period 1950 by 34 percent with a figure of $7,399,177,000.

Boosting the non-residential classification for May, and in turn the general construction total, were three Atomic Energy projects with awards totaling $980,000,000. The largest, $600,000,000, was the Savannah River project in South Carolina.

The non-residential contract total at $1,633,908,000 in May was 215 percent higher than in April and 300 percent greater than in May a year ago. Residential awards of $661,094,000 were 12 percent above April, but 2 percent below May, 1950. Public and private works and utilities at $277,959,000 were 4 percent higher than in April and 5 percent greater than in May last year.

Five-month totals for 1951 showed the following gains over the comparable period in 1950: Non-residential, $3,513,365,000, up 89 percent; residential, $2,778,575,000, up 6 percent; public and private works and utilities, $1,107,237,000, up 8 percent.

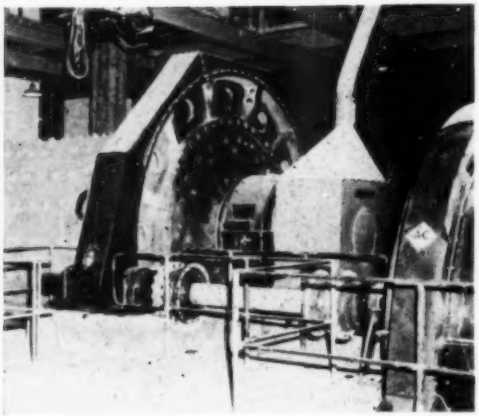
Lone Star, Va.

By WALTER E. TRAUFFER

Lone Star Cement Corporation builds a 2-kiln dry-process plant with a daily capacity of 4,000 barrels

another ON THE SPOT report

The newest cement plant in the United States is that of the Lone Star Cement Corporation at Lone Star, Virginia, about 15 miles north of Roanoke. This new 2-kiln, 4,000-bbl. capacity dry-process operation also has the distinction of being one of the best plants in existence. It is not only pleasing to the eye, but on inspection gives the unmistakable impression that it was designed for efficient and economical operation. It has no unnecessary frills, but neither does it lack anything that a modern cement plant



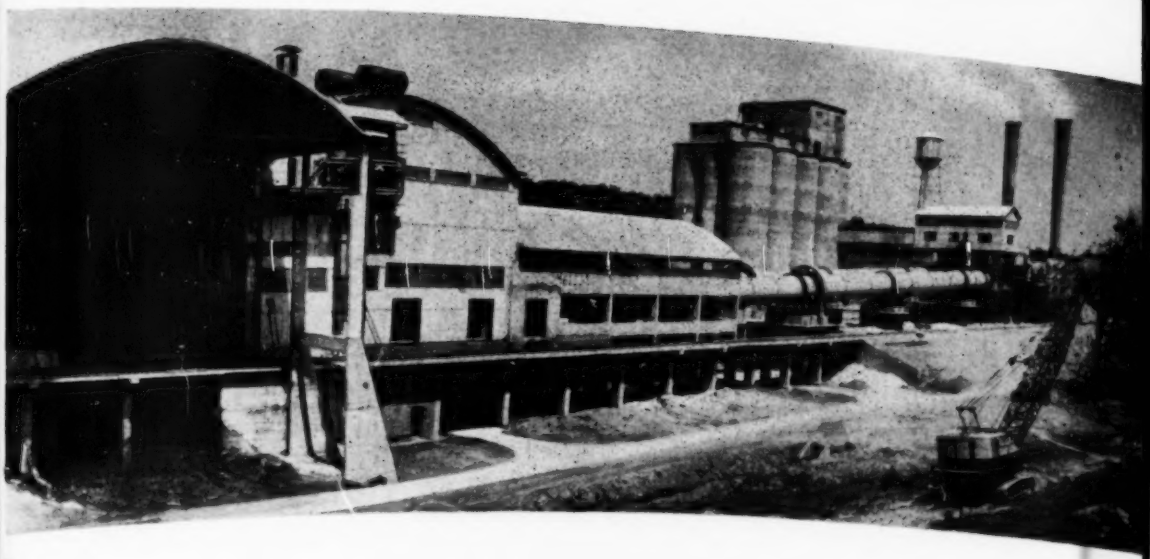
At top of page: General view of Lone Star's new Virginia plant.

From left to right: Secondary crusher with feeder above and belt conveyor below.

One of the raw-grinding ball mills.

Kiln dust collectors with fans and stacks.

The two 10- by 340-ft. kilns.

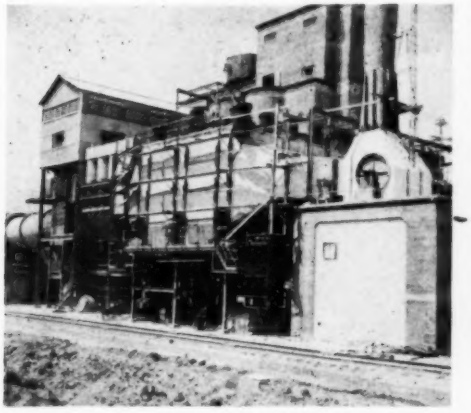


the nation's newest cement mill

should have. Record speed was made in building this plant, as ground was broken on July 1, 1950, and the first kiln was started up on May 3, 1951, with the second following on May 11, The first finished and fully-tested cement was shipped out in June after 28-day tests had been completed. The location was selected after many other deposits had been investigated as it had the best combination of deposit, accessibility, and proximity to principal markets.

This plant is one of a number in the country which the cement industry is rushing to completion in order to alleviate the cement shortages which were so serious in some areas in 1950 and which are again cropping up in some places. The area around Roanoke was particularly hard hit last year and the fact that it was in the center of a large market induced Lone Star to build a new plant near Roanoke, rather than to expand its existing facilities at South Norfolk, about 250 miles to the east. Shipments are being made from the new plant throughout southwestern Virginia and adjacent sections of West Virginia and North Carolina.

This compact and modern operation is one of the few new dry process plants built in recent years. The dry process was chosen because the raw materials lent themselves well to such processing and economies. The plant is conventional in design, and the chief objectives were high efficiency and dust-free operation. There are 18 dust collectors strategically located throughout the plant, and the kilns are equipped with both mechanical and electrical collectors. Economy also guided the selection of 340-ft. dry-kilns with no waste-heat, rather than shorter kilns with

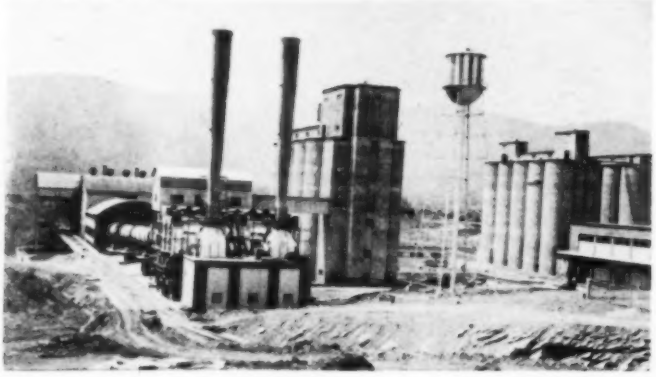


Above: A 3-cu. yd. electric shovel loading one of the 15-ton side-dump truck trailers in the quarry.

Below: The primary and secondary crusher buildings, with the conveyor to the storage building in the background.

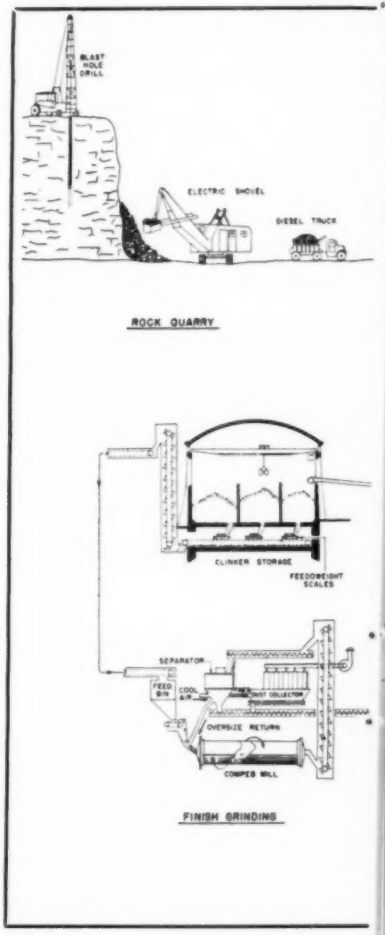
At right: Flow diagram showing continuous path followed by aggregate from quarry to packing and loading.

Below: A general view of the plant, showing kilns, dust collectors, stocks, raw and cement silos, and the packhouse.



waste-heat boilers. Purchased power was available at a reasonable price; so it was preferred not to install expensive boilers and power generating equipment. There is ample room for expansion throughout the plant to 50 percent above the present capacity, including a third kiln. The plant was designed from the outset to produce all types of specification cements, including masonry and air-entraining cements.

After some delay in acquiring the right-of-way for and building a 9-mile railway from the Norfolk & Western Ry. at Cloverdale to the plant site, the contract for building the plant was let in April, 1950, to the Walsh Construction Co. in conjunction with the Ralph E. Mills Co. of Salem, Va. The Walsh firm had built the railroad (known as the Cloverdale & Catawba Ry.), which was subsequently sold to and



operated by the N. & W. Ry. All of the materials and equipment for the plant were carried by this railroad, as there was no other practicable way to bring them in. The building of the railroad and the track system within the plant constituted a major construction project, the spur track and the five switch tracks requiring the removal of some 500,000 cu. yd. of rock, shale, and earth.

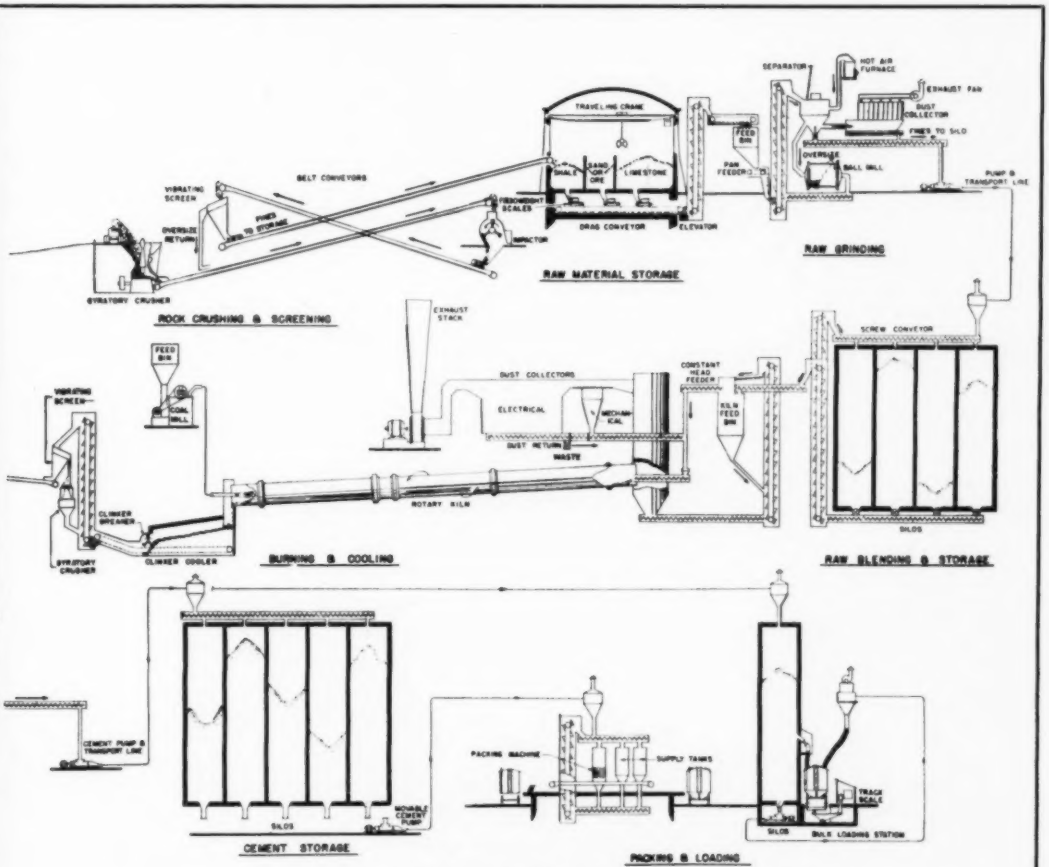
An additional 150,000 cu. yd. had to be removed to clear the plant site before construction could begin. Ground was actually broken for the plant on July 1, 1950. The first rock went into the crusher on April 5, 1951; the first kiln was started up on May 3, and the second on May 11.

Quarrying and Haulage The limestone in this deposit has a $CaCO_3$ content of about 95 percent. The shale contains 36 to 50 percent $CaCO_3$. As the rock outcrops pretty generally, there is little overburden to remove except for occasional clay pockets which are somewhat difficult to get at. The surface soil is removed by a ¾-cu. yd. P&H trench hoe and is hauled away by a truck. Drilling for primary blasting is done with two Bucyrus-Erie 27T well drills using 7-in. bits. As the quarry is worked back into the deposit, the floor will be sloped downward until the face reaches a height of 75 ft. It is known that there is good rock down at least 200 ft. below that level, and lower levels may be opened as needed. Ordinary blasting practices are followed, and jackhammers are used to drill for secondary shooting. Shaped Charge Explosive Manufacturers' shaped charges are being used experimentally with excellent results. Two Marion 3-cu. yd. electric shovels are used to load the stone into trucks.

The shale quarry adjacent to the stone quarry is operated whenever it is necessary to replenish the shale storage and it is processed through the same crushing plant as the stone.

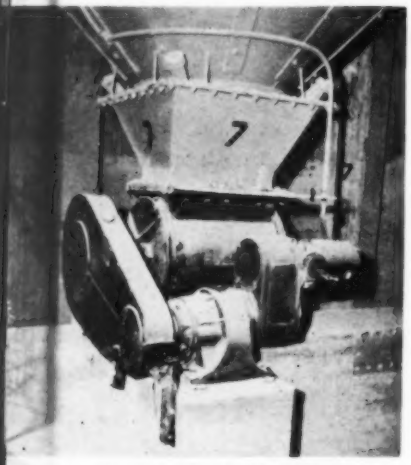
Hauling from the quarries to the primary crusher building is done by three truck trailers with Easton 15-ton side-dump trailers and Mack tractors. At present the haul one way is about 500 ft., but this will increase to 1,000 ft. or more as the quarries are developed. The trucks can be dumped from either side of the primary crusher by Easton elbow-type dumping hooks which are self-engaging. These have their hoists mounted above and are remote-controlled by the crusher operator.

Crushing The primary crusher is a 42-in. Allis-Chalmers McCully gyratory which is driven



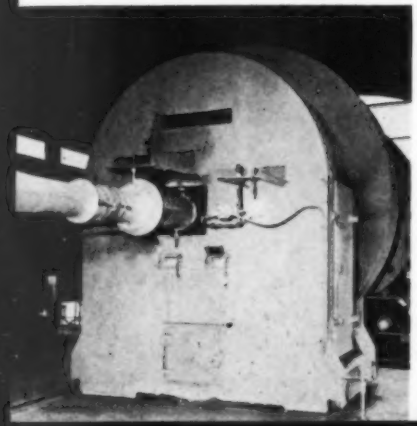
—FLOW SHEET SHOWING MANUFACTURE OF LONE STAR CEMENTS—
LONE STAR, VIRGINIA

Above: The 35-ft. bag-type dust collector connected to one of the two raw-grinding and drying circuits.



Above: A rotary feeder to the screw conveyor under the raw silos.

Below: A kiln hood, with its water-cooled burner pipe and optical pyrometer.



through Texropes by a 200-hp., 440-v., 720-r.p.m. Allis-Chalmers motor. The crusher is set for a 6-in. minus product which is discharged on a 42-in. by 280-ft. inclined belt conveyor (No. 1) to the secondary crusher building.

There the material is discharged into a surge hopper from which a 72-in. Chain Belt pan feeder discharges it into a reversible Pennsylvania Impactor (Size CF 15-50). This crusher is direct-driven by a 400-hp., 900-r.p.m., 4160-v. Allis-Chalmers motor. The minus 2-in. product of this crusher is carried on a 42-in. by 125-ft. inclined belt conveyor (No. 2) to a pair of Allis-Chalmers 5- by 11½-ft., single-deck Ripl-Flo screens. These have ⅝-in. clear slotted openings. The oversize material is discharged back onto Conveyor No. 1 for return through the Impactor. The minus ⅝-in. material through these screens is carried on a 24-in. by 960-ft. belt conveyor (No. 3) to the cement plant storage building. This conveyor is mounted on steel trusses and frames on concrete footings. Most of conveyor No. 3 is in the open except that the belt and idlers are covered completely with short sections of corrugated metal hoods which may be removed easily for inspection and maintenance.

The quarry and crushing departments are operated five 8-hr. days weekly to supply the needs of the cement plant.

Storage Building The storage building at the cement plant is of monolithic concrete construction and is 340 ft. long by 75 ft. wide. All materials are distributed into and reclaimed from the various sections and transferred to the mill feed bins by two Bedford 10-ton overhead electric traveling cranes handling 3-cu. yd. Blaw-Knox clamshell buckets. In this building there is storage space for 8,500 tons of limestone, 11,000 tons of shale, 320 tons of sand, 400 tons of iron ore, 25,000 bbl. of clinker, 500 tons of gypsum, and 20,000 tons of coal. The sand, ore, gypsum, and coal are received in hopper-bottomed railroad cars and are dumped from a trestle and rehandled by one of the cranes into their respective sections.

Although the shale forms only about 35 percent of the raw mix, the largest storage section is used for it, so that the changeover from stone to shale quarrying is at the longest possible intervals. The stone is more nearly uniform in analysis than the shale and can be run safely through the storage to the mills with only occasional analysis.

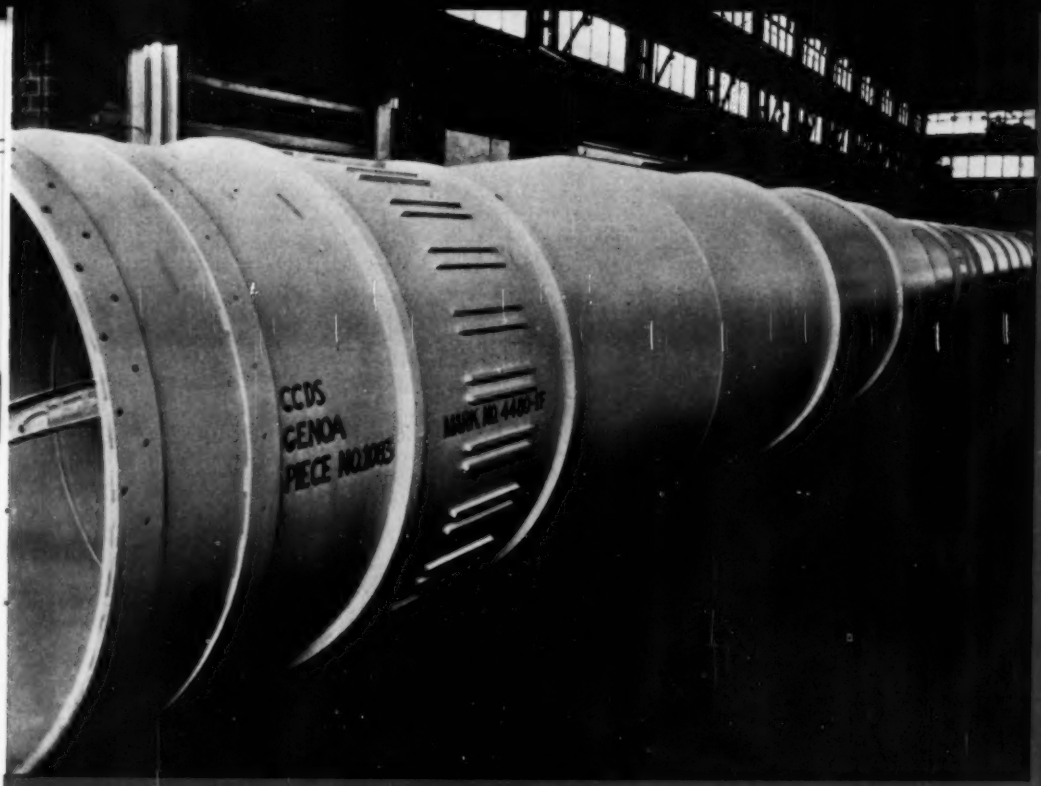
Raw Material Grinding The raw materials—stone, shale, sand, and ore—are transferred from storage by the cranes into five separate 325-ton raw-mill feed bins, two for stone and one each for the other materials. Under each of these bins is a Merrick 24-in. Type WS Feedoweight for proportioning the raw materials. The five Feedoweights discharge to a 16-in. Kensington Ken-Krome drag chain conveyor. A 61-ft. chain bucket elevator carries the blended raw mix to another drag chain which discharges it into a 100-ton mill feed bin for each of the two identical raw-material grinding and drying systems.

Each system is supplied from the feed bin by a pan feeder and a 65-ft. bucket elevator. The elevator discharges the proportioned raw mix into a 16-ft. Sturtevant mechanical air separator which is in closed circuit with a 9½- by 15-ft. Allis-Chalmers ball mill. Drying is done by means of two Air Devices, Inc., oil-fired hot-air furnaces, one for each system. Each furnace supplies air at 400 deg. F. to its separator. The coarse material (oversize) from each separator is discharged into its ball mill and the mill product is fed by screw conveyor back to the elevator feeding the separator. The air and extreme fines from the separator go to a 35-ft. Norblo bag-type dust collector from which a fan exhausts the air to atmosphere. The fine product of the separator and the dust from the collector form the finished raw mix (90-92 percent through 200-mesh). A screw conveyor feeds this to the 9-in Fuller-Kinyon pump, which transports it to the raw blending and storage silos through an 8-in. pipeline. A Fuller rotary compressor located near the pump supplies air.

The two elevators and two separators in these circuits and their connecting ducts and screws are insulated with mineral wool blankets. The two Allis-Chalmers ball mills are driven at 19.2 r.p.m. by 700-hp., 180-r.p.m., 4150-v. Allis-Chalmers synchronous motors with 80 percent leading power factor. Each mill has a load of 90,000 lb. of 3½- to ¾-in. grinding balls. Each separator is driven through a flexible coupling and a Falk reducer by a 100-hp. motor.

Raw Material Blending The finished raw material is discharged from the Fuller-Kinyon pump line into a Fuller alleviator at the top of the silos. This de-aerates the mix before it is discharged into a series of screw con-

(*Continued on page* 119)



KILNS...BUILT BY KENNEDY
STEP UP PRODUCTION BY 20% OR MORE

Illustrated above is a 230′ kiln being readied for shipment at our Danville, Pa. plant. It is designed to increase production at least 20% over the kiln it replaces.

KENNEDY-built kilns incorporate the very latest proved —and approved — engineering features, including steel plate tires with rollers set on self-aligning bearings. Made in all sizes, to meet specific requirements, KENNEDY kilns have established production and low-cost maintenance records that are unequalled.

Performance records, capacity and output tests show that KENNEDY long kilns not only increase production but last longer and operate at lower cost. Finest quality materials and workmanship and engineering design built into machines that earn larger profits for their users.

One of their outstanding features is the *uniform* quality of all grades of cement produced by KENNEDY rotary kilns. Users say "It Costs Less To Own The Best" . . . that's why they specify KVS!

Send for bulletin describing KVS Kilns, Coolers & Dryers

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Unrivaled manufacturing and shop facilities with engineering skill of the highest calibre.

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An outstanding example of Correct Engineering, Planning & Building

DESIGNED BY KVS ENGINEERS, **built by KVS craftsmen, the Kennedy "Streamline" Cement Plant can be built at moderate cost to include every facility for the efficient and profitable production of all types of cement.**

Every department is located and equipped to insure the streamlined handling of every element from raw material to the storage of finished products. Special attention has been devoted to conservation of space and the installation of a fast-moving production line eliminates lost and waste motion.

OPERATIONS IN EVERY DEPARTMENT ARE AUTOMATIC. **Maximum control of quality by chemists and operators reduces to a minimum the need for highly skilled help. The best in modern flow sheets has been used in proper combination to attain utmost usage of all machinery and equipment, such as crushers, screens and a specially designed and simplified transportation system.**

EXPANSION OF ANY DEPARTMENT **can be accomplished without interruption to daily operations. Extra space provided . . . additional machinery and equipment installed . . . all production facilities increased at minimum expense and without loss of time in shut-downs or disturbance of initial installation.**

THE KENNEDY STREAMLINE PLANT **can be erected within limited areas, with only minor adjustments to meet property sizes or irregularities of terrain, and includes every provision for primary and secondary crushers, limestone preparation, closed circuit grinding, screening, dewatering, burning, transportation and storage.**

YOUR INQUIRIES ARE INVITED, **whether you wish to erect a new plant or modernize an existing layout. KVS engineers can adapt the "Streamline" plant to meet your needs. A complete bulletin describing the function, operation and location of each department is available upon request. An experienced Kennedy Cement Engineer will call on you and make recommendations.**

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BUILT STRONGER TO LAST LONGER WITH THESE EXCLUSIVE KVS FEATURES

★

Synchronous motor built into pulley assembly

★

Frictionless, smooth, quiet operation

★

Power applied only for crushing

★

No gears to waste power

★

Forced Feed lubrication

★

Roller bearings

★

Added power at no extra cost

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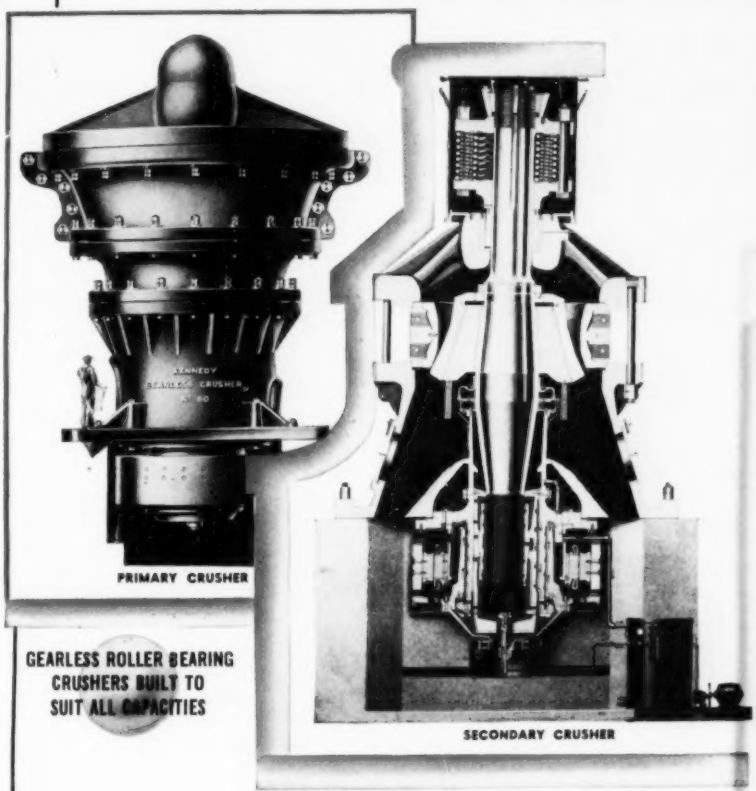
Costs less to operate

★

Greater capacity with use of less power in all models

Kennedy Gyratory Crushers

Produce Maximum Tonnage Daily



GEARLESS ROLLER BEARING CRUSHERS BUILT TO SUIT ALL CAPACITIES

KVS GYRATORY CRUSHERS are designed to produce maximum tonnage of uniform products, consistently, economically, with a remarkable record of freedom from shut-downs for repairs.

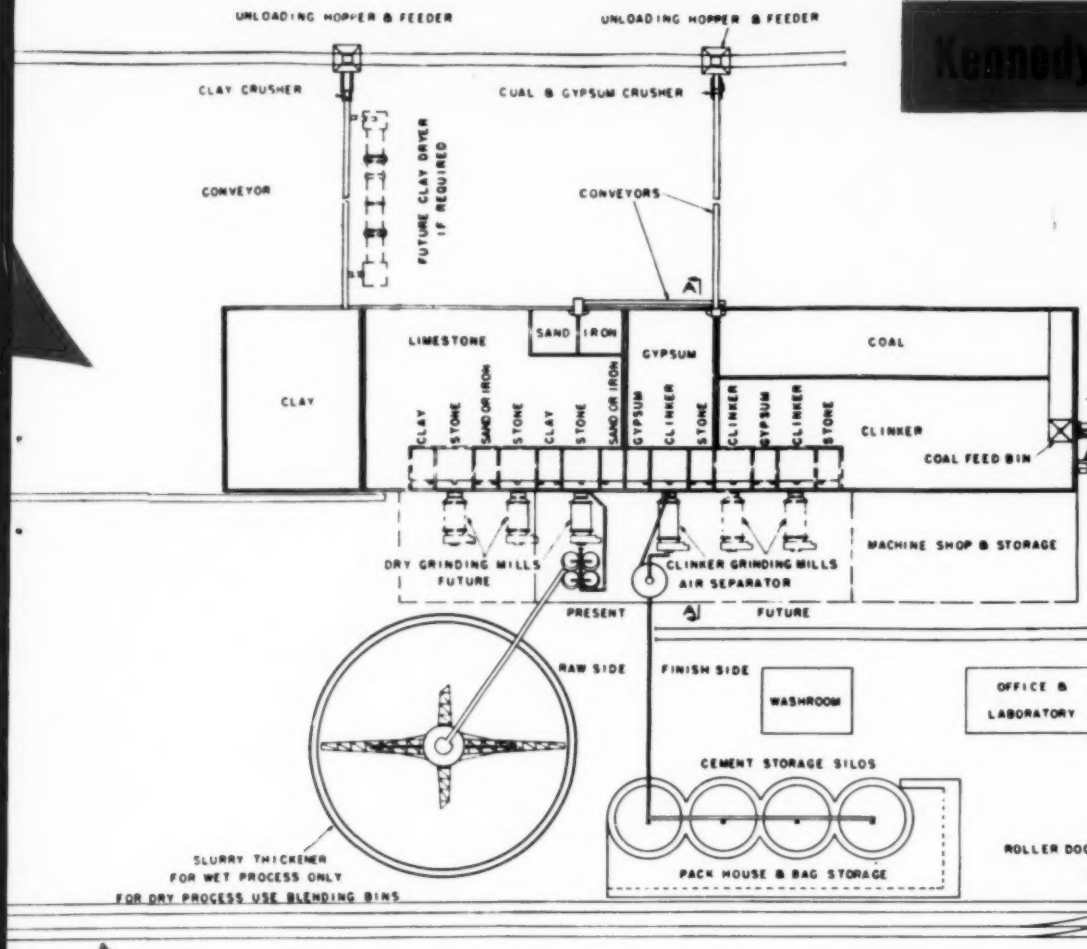
BUILT-IN QUALITY AND FINE WORKMANSHIP is the answer. The engineering principles which make Kennedy crushers the most outstanding in the field, come to life in the use of chemically tested steel and highest quality materials.

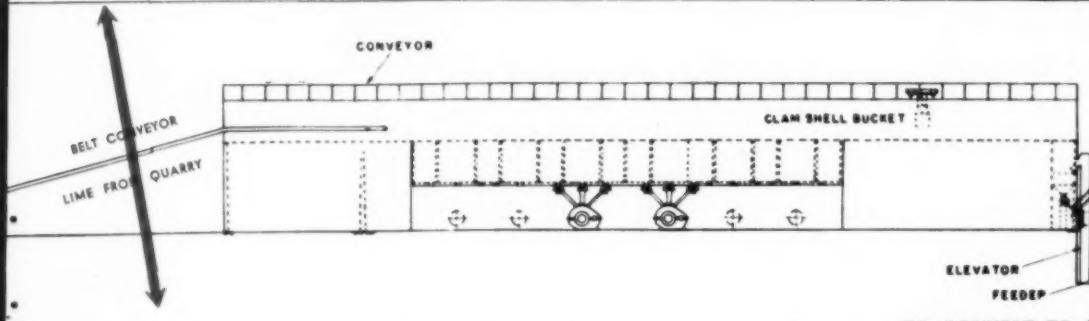
EXTREMELY RUGGED CONSTRUCTION cuts operating costs, reduces maintenance to a minimum and delivers more rock tonnage, faster and at lower cost than any other comparable model.

THE KVS OILING SYSTEM HAS BEEN PRONOUNCED virtually "fool-proof". These fine crushers run for years with practically no maintenance. Send for bulletin describing the complete line of KVS crushers. They show why "It Costs Less To Own The Best."

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

TWO PARK AVENUE, NEW YORK —:— PLANT: DANVILLE, PA.





Primary and Secondary Crushers, Conveyors, Rock feeder and limestone bedding storage for blending grades of stone NOT SHOWN ON THIS PLAN. Marginal lines indicate location.

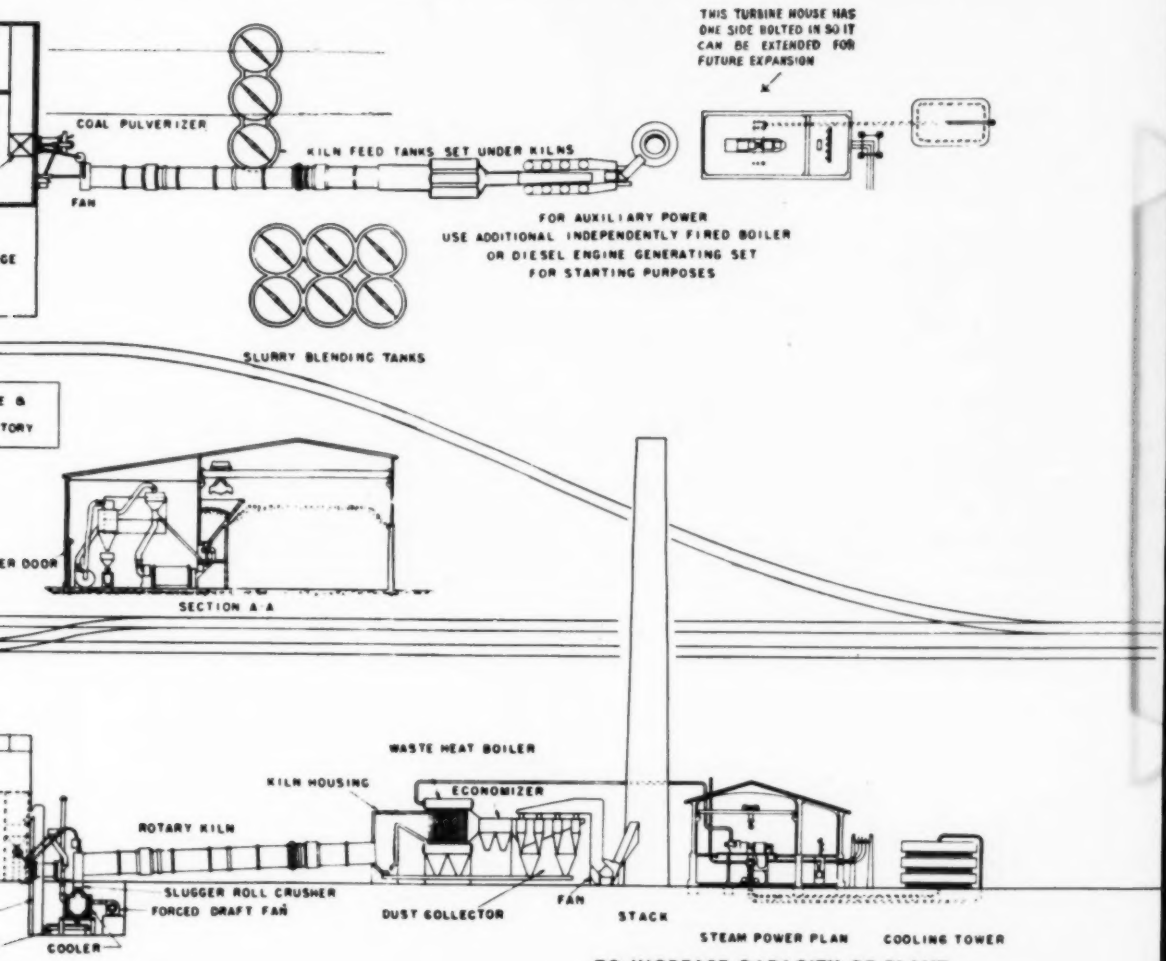
TO CONVERT TO

The only change in plans sho
dry raw material storage and
thickeners and slurry storage t

CTURING & ENGINEERING CORP.

edy Wet-Process "Streamline" Portland Cement Plant

Showing special features, original and exclusive arrangements of departments, handling facilities, machinery, equipment and buildings



TO DRY PROCESS

shown is the substitution of and blending silos for slurry ge tanks.

TO INCREASE CAPACITY OF PLANT

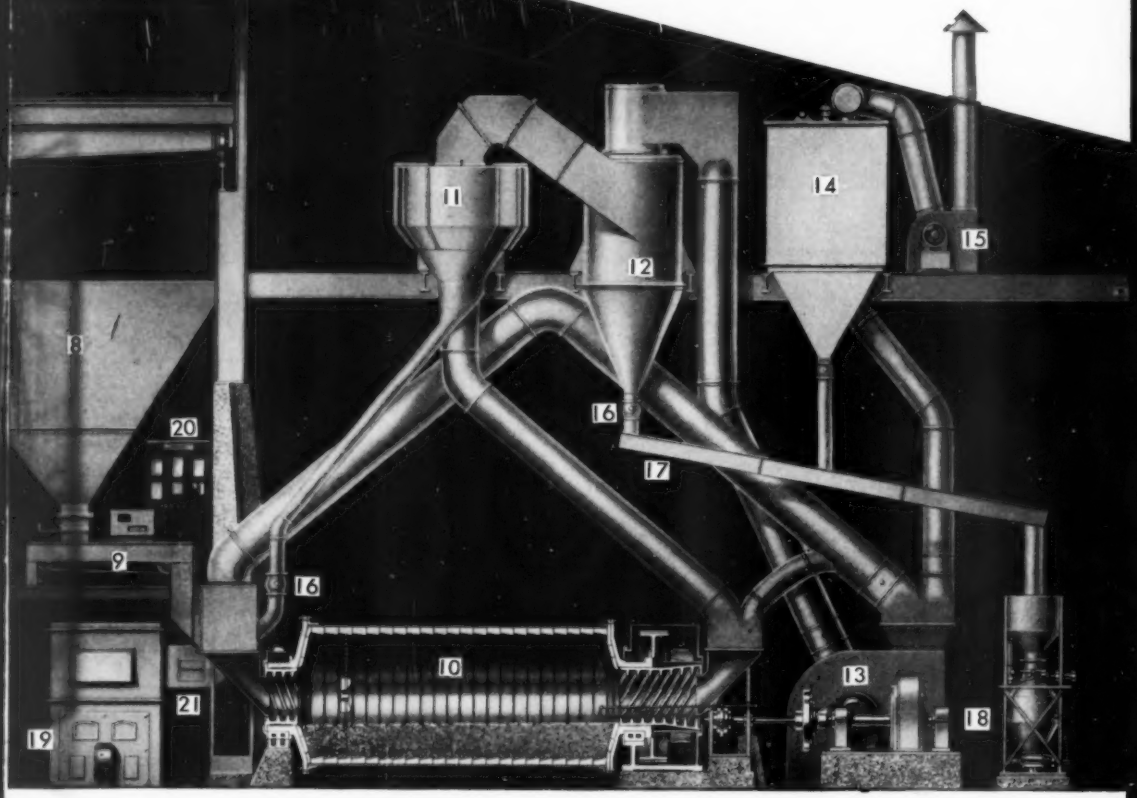
By 100%—Install 1 add'l Kiln & Cooler
Install 1 add'l Tube Mill for raw & finished side
By 200%—Install 2 add'l Kilns & Coolers
Install 2 add'l Tube Mills for raw & finished side

TWO PARK AVENUE, NEW YORK • PLANT: DANVILLE, PA.

KENNEDY STRATIFIED AIR SWEPT TUBE MILL SYSTEM

(Patents Pending)

for raw stone, ore and clinker grinding lowers grinding costs...reduces power consumption...cuts maintenance costs



8 Mill feed hopper
9 Weighing feeder
10 Stratified Air swept tube mill
11 Radial flow classifier
12 Cyclone collector
13 Mill exhauster
14 Dust filter
15 Dust filter exhauster
16 Rotary air locks
17 Finished material conveyor
18 Automatic pneumatic transport pump
19 Hot air furnace
20 Instrument and control cubicle
21 Automatically controlled tempering air damper

The Kennedy Stratified Air Swept Tube Mill System produces 94% plus through 325 mesh when grinding clinker 2" and finer. It dries and grinds simultaneously and air-cools cement while grinding clinker.

The Kennedy Stratified Mill not only handles raw material, but becomes a *combined dryer and cooler*, thereby serving a three-fold purpose.

Marked economy of operation sets the Kennedy mill apart. By comparison, the savings effected in power consumption, wear-and-tear and man-hours, more than pay the initial installation cost within a ten-year or shorter period. Send for blue-prints and operating data. They show why users say "It Costs Less To Own The Best."

KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

TWO PARK AVENUE, NEW YORK —◇— PLANT: DANVILLE, PA.

Lone Star, Va.

(From page 112)

veyors feeding the silos, thereby helping to reduce the dust problem. The alleviator is vented to atmosphere through a Sly dust filter, and the collected dust is returned to the circuit.

The storage consists of two rows of four self-cleaning 3,000-bbl. silos each 22 ft. in diameter and 85 ft. high. Fuller rotary feeders under each silo proportion the materials from two or more silos to screw conveyors under each row. Each withdrawal screw feeds a separate elevator, built in two sections because of the extreme height, and from these the material can be returned either to the silos by distribution screws for reblending or transferred into three star bins or interstices which serve as kiln feed storage for blended raw mix. Each of these interstices also holds 3,000 bbl. Under each of the blended kiln feed silos there is a Fuller rotary feeder. These discharge into a screw conveyor which can feed the first leg of either elevator for kiln feed. A screw conveyor carries this material to a 150-bbl. kiln feed bin.

Raw mix for only one type of cement is stored in the silos at any one time; and when types are changed, the large silo capacity and flexibility of storage makes it possible to start grinding a mix for another type of cement several days before the existing mix is burned out. An Otis passenger elevator provides access to the top of the silos in place of the usual man-lift.

Clinker Burning The two separate and independent kiln feed systems consist of a Fuller feeder withdrawing material from the 150-bbl. feed bin into circulating screw conveyors and elevators which in turn discharge into constant-head feeders. Any material not absorbed by the kiln feeder overflows into the feed bin and is recirculated with the new feed from the raw mix silos. The constant-head feeder discharges through a chute into a kiln-feed screw which projects through the dust chamber into the kiln. The dust from the Buell mechanical collectors following these chambers is fed back into the system by collecting screws into the circulated feed. The dust collected by the final electrical precipitators is not returned to the kilns, but is being carried to a waste dump. This system insures constant feed to the kilns by keeping the feed screws full, and de-aeration of the raw material reduces the kiln dust losses.

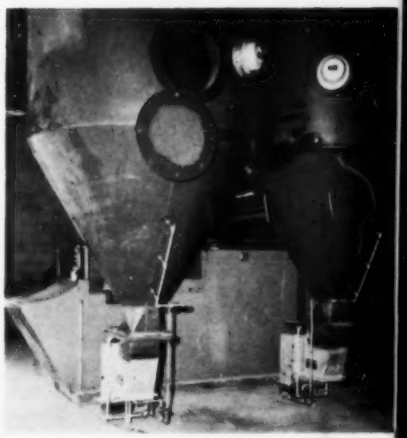
The two Allis-Chalmers 10- by 340-ft. rotary kilns are of all-welded construction and each is mounted with a pitch of 7/16 in. per ft. on five tires and water lubricated rollers. Each kiln is driven by a 75/100-hp., 400/1200 r.p.m., 230-v. d.-c. Allis-Chalmers motor through a Falk Herringbone speed reducer followed by a cut helical-bull pinion and ring gear. There is an auxiliary Allis-Chalmers gasoline engine to keep the kiln rotating in case of power failure. It is connected through a smaller Falk reducer and a clutch to the motor shaft for smooth and efficient operation.

Each kiln is producing its rated capacity of 2,000 bbl. daily at a speed of about 50 rev. per hr. A burning temperature of about 2,700-2,800 deg. F. is maintained.

Each kiln has a 6-in. lining, 70 percent alumina being used in the burning zone and 40 percent elsewhere. No insulation is used. The kiln feed end opening is restricted for better draft control. The discharge or firing end is equipped with an air-cooled nose ring designed to keep the kiln-nose end-casting from overheating, flaring out and breaking. The firing hoods and the back end dust chamber are lined with A. P. Green castable refractories. When the kilns are relined, the refractories will be palletized and handled by a freight-type elevator and lift trucks.

The constant-head kiln feed screw is synchronized with the kiln speed, and burning adjustments are made by varying the speed of the kiln and the rate of fuel feed. Long dry kilns are subject to the same restrictions as long wet kilns in that constant speed control must be maintained and fluctuating loads must be avoided. At this plant the kiln speed is set at a definite rate and adjustments are made by varying the rate of fuel feed. Kiln speed is changed only when absolutely necessary.

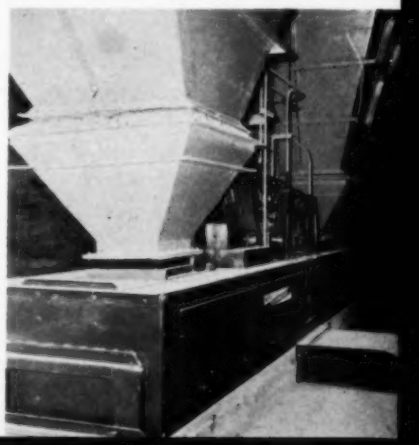
Only the most essential instruments are used, and these are mounted on an individual control board for each kiln. Instruments include the following: Brown tachometer recorder for kiln speed; Brown radiamatic pyrometer clinker temperature recorder; Brown pyrometer recorder for kiln exhaust gases and dust collector inlet temperature; Brown Fuller-cooler bed-speed recorder and controller; Brown coal-mill temperature recorder and controller; Hagan coal-mill regulator; Hays draft gauges; Weston ammeters, etc. Indicating lights also give the burner information on the operations of all equipment related to the kiln.

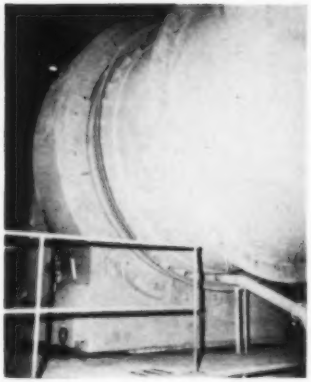


Above: Cement storage tanks for one of four packers, with bin level indicators and airfeeders.

Above: The inclined grate cooler for one of the kilns, with a clinker crusher in foreground and duct to the fan above.

Below: Two of the five weighing feeders supplying proportioned raw materials to the mills. These two units weigh sand and iron ore.





Above: The air-cooled discharge end of a kiln.

Below: The dust collector connected to equipment in the kiln room.

Below: The bulk silo structure consisting of five 13,000-bbl. silos in line and the main silo structure for packing house shipments consisting of two rows of five 13,000-bbl. silos, two of which are used exclusively for masonry cement. Part of the packinghouse is visible at right.

Stack Dust Collection As has been stated, the exhaust gases at 1,100-1,200 deg. F. and the dust from each kiln pass into a rectangular dust chamber from which collected dust is returned to the kiln feed system. Atmospheric air is blended in at this point to reduce the temperature of the gases to about 600-700 deg. F. as they go into the Buell 6-unit dust collectors, which are rated at 100,000 c.f.m. at this temperature. The dust from each collector is returned to its kiln feed system. The gases then pass at 600 deg. F. into a Koppers-Elex two-chamber electrical precipitator of the rod-curtain type. Either chamber may be isolated for maintenance or repair while the other remains in use. The collector is thermally insulated to minimize condensation and corrosion.

These collectors are in duplicate for each of the two kilns, and each is connected to an individual Thermix (Prat-Daniel) 100-ft. venturi-type self-supporting steel stack. Each stack has a Size 155 Thermix fan, complete with louvre-damper, and driven by a 200-hp., 720-r.p.m., 440-v. motor through V-belts.

The combination of these two types of dust collectors is considered the most efficient and economical arrangement possible.

Coal Firing The coal used for direct firing these kilns is 1-in. West Virginia slack, low-sulphur, high-fusion, and low-ash. This fuel is brought from the storage building by Screw conveyor and elevator to the two 50-ton coal mill feed bins, each of which feeds a Raymond No. 473A direct-firing bowl mill through an independent roll-type feeder on the firing floor above. The mills are driven by 150-hp., 1,200 r.p.m. motors. Drying air is drawn from the clinker cooler at 350-400 deg. F. through a small Multiclone to remove clinker dust. The coal mill temperature controller keeps the primary air going into the kiln with the coal at 180 deg. F. The coal is rated at 14,000-B.t.u. per lb., and a kiln fuel rate of 900-950,000 B.t.u. per bbl. is expected.

Clinker Cooling The clinker from each kiln is discharged into a Fuller 6- by 33-ft. inclined grate cooler. Excess air from the cooler is vented through a Multiclone dust collector and a Norblo fan. The grate discharges the 150-deg. F. clinker through a hammermill-type breaker to a drag chain conveyor. A 65-ft. bucket elevator feeds it to an Allis-Chalmers 3- by 6-ft. Aerovibe single-deck screen with 3/8-in. wire cloth. Each of these flows is in duplicate, and the oversize from each screen drops into an Allis-Chalmers No. 330 Hydrocone crusher. The crusher product is returned to the elevator in closed circuit. The screen fines are carried on a 24-in. by 120-ft. belt conveyor to the clinker section of the storage building. A Sly dust filter vents the elevators, screens, and clinker crusher.

Clinker Grinding The clinker and gypsum are reclaimed from storage by the cranes into 1650-bbl.-capacity bins, two for clinker and one for gypsum. The second clinker bin may be used for raw limestone when masonry cement is being made. Three Morrick Feedoweights, one under each bin, proportion these materials to a drag chain conveyor followed by an elevator to another drag chain. This supplies the three 60-bbl. finish mill feed bins for the three identical finish-grinding systems.

There are three completely separate grinding circuits. A pan feeder under each bin feeds an Allis-Chalmers 8- by 32-ft. 2-compartment compeb mill which is in closed circuit with a 16-ft. Sturtevant mechanical air separator. The separator in turn is air-cooled through a 30-ft. Norblo dust collector. The discharge from each mill is carried by a bucket elevator to a screw conveyor feeding the separator. The tailings from the separator are returned to the mill through a Fuller-Huron Airslide. A special inlet admits cooling air to the separator, which exhausts through the dust collector and fan. The fines from both the separator and the collector are discharged into a screw conveyor as finished cement (90-93 percent through 325-mesh). An 8-in. Fuller-Kinyon pump transports the

finished cement through an 8-in. pipeline to the cement storage silos. The air-cooling system is working very well and has been used successfully in several other Lone Star plants. The main advantage of this system is that it cools the cement as it is made, thereby increasing the grinding efficiency.

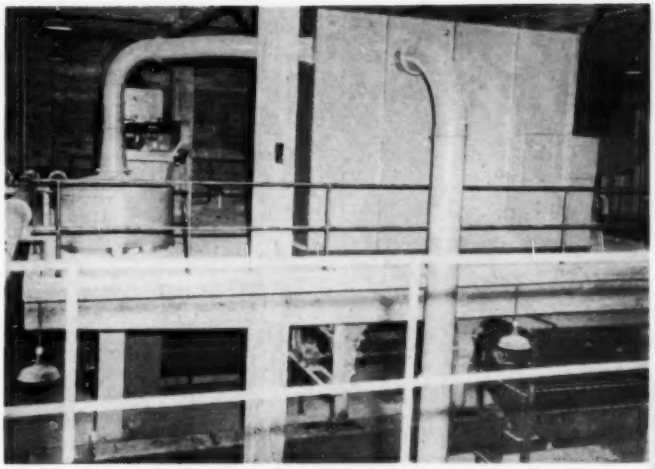
The air separators are driven through flexible couplings and Falk reducers by 100-hp. motors. They are equipped with 60 auxiliary blades instead of the usual 48, so that the number of blades may be adjusted in multiples of one to six without throwing the separator out of balance. Each finish mill is driven by an 800-hp., 180-r.p.m., 4160-v. Allis-Chalmers synchronous motor through an Amerigear floating shaft coupling. Like the raw mill motors, these are designed for 80 percent leading power factor to improve the total power factor. The mills are lined with hardened steel plates of the Lorain type, and each is charged with 130,000 lb. of 3½- to ⅝-in. steel balls.

The finish mill dust collectors are standard units with a classifying or settling chamber on the inlet side.

Cement Storage The Fuller-Kinyon cement line terminates at a Fuller alleviator on top of the main cement storage silos, and a dust filter releases the air to atmosphere. A branch line terminates similarly on top of the bulk silos. In each case screw conveyors distribute the cement into the silos.

The bulk silo structure consists of five 13,000-bbl. silos in line, each 26 ft. in diameter by 110 ft. high. Cars are loaded with bulk cement through the sides of these silos. A dribble-bin and track scale will also make it possible to load cars quickly to any desired weight, the cement in this case being pumped through an alleviator and dust filter into the dribble-bin.

The main silo structure for packhouse shipments consists of two rows of five silos, each 26 ft. in diameter by 110 ft. high and having a unit capacity of 13,000 bbl. Two are used exclusively for masonry cement. The four interstices between this group of silos are used for venting the basement of the silos. All silos have conical self-cleaning bottoms equipped with Fuller-Huron Airslides, and cement is drawn from them to Fuller-Kinyon 7-in. cement pumps mounted on rails. Each of the three pumps is supplied with air at 35 lb. pressure by an individual Fuller Size C250 rotary compressor. There is a separate screw conveyor and elevator system for transferring masonry cement to the packhouse. An Otis passenger elevator provides easy access to the top of the main silos, and a connecting footbridge a walkway to the top of the bulk loading silos.

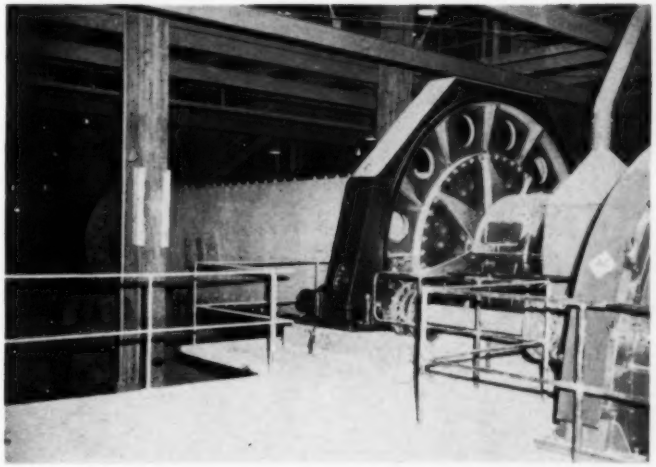


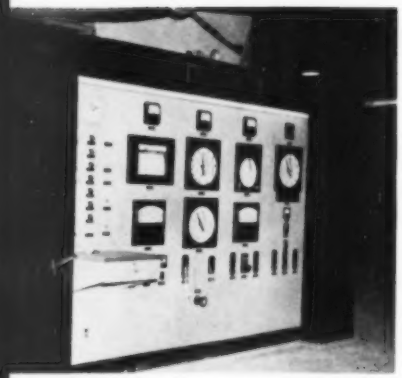
The dust collector and alleviator in one of four packhouse flows, with screen and screw below.

Packing and Shipping The packhouse is similar in design to those installed at the Dallas and Birmingham plants and described previously in PIT AND QUARRY. The cement is pumped from the silos to alleviators and vented through Sly dust filters over each of the four packers at three stations. Each of these is a St. Regis 4-tube Type 150C valve bag packer rated at 1,000 to 1,200 bags per hour. One station has two packers, one for masonry cement and the other for all other types. Each of the other two has one packer for all types except masonry.

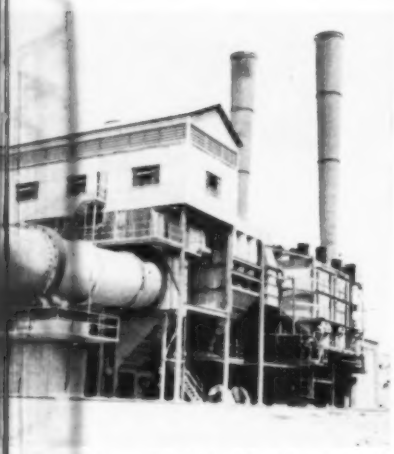
In each of the four flows the cement from the alleviator drops by gravity into a 150-bbl. circular steel tank equipped with Bindicators which control the Fuller-Kinyon pump supplying the cement from the silos. A Fuller-Huron feeder discharges the cement from this circulating tank into a screw conveyor and elevator which feeds it into a screen conveyor to remove debris. The cement is then discharged into

One of the three 8- by 32-ft. two-compartment finish grinding mills, with an 800-hp. motor and floating shaft coupling at the right.



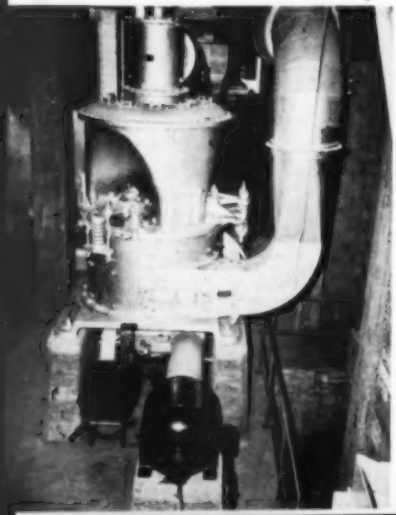


Above: The individual control board for one of the two kilns.



Above: The feed ends of the kilns with dust collectors and stacks.

Below: The direct-firing coal mill for one of the kilns.



a 150-bbl. packer feed tank which is also equipped with Bindicators for controlling automatically the feed from the circulating tank. The spillage from the packers drops into the recirculating screws. Each packer has a reversible wire conveyor for loading out bags on either side of the packhouse. Cars are loaded by three-man crews at each station using hand trucks, a system which is preferred because no one is required to remain in the heat and dust of a car for any length of time. Magnesium dock boards, easily handled by one man, are used. A 44-ton Plymouth diesel-electric locomotive does all yard handling of cars.

The adjoining 2-story bag storage building has a freight elevator, and bales of bags are trucked to chutes for each packer. Incoming bags will be palletized and handled by means of power lift trucks. An Allen-Billmyre vacuum cleaning system serves both the baghouse and packhouse.

Electrical Power Power is purchased from the Appalachian Light & Power Company and is brought in at 33,000 v. to the two company-owned 3,750 kv.-a. Allis-Chalmers master substations which reduce to 4,360 v. Throughout the plant there are seven General Electric 4,160/480-v. transformers; a 500-kv.-a. unit for the quarry and crusher building; a 750-kv.-a. unit for the raw mill department; a 750-kv.-a. unit for the raw silos and kiln dust collectors; a 750 kv.-a unit for the kilns and coal mills; a 750-kv.-a. unit for the finish mill department and cranes, a 750-kv.-a. unit for the packhouse and cement silos; and a 150-kv.-a. unit for the shops and offices. (All motors over 300 hp. are 4,160 v.; all others are 440 v.) Control is centralized in a main Allis-Chalmers switchgear distribution panel which is located in an enclosed structure adjacent to the raw- and finish-mill building. Power is distributed through a manhole and duct system with a minimum of exposed wiring. The motors installed in this plant total about 6,000 hp.

Other special electrical equipment in this plant includes two 250-kw., 250-v. synchronous motor-generator sets and two Lincoln motor-generator sets for inching the grinding mills.

Laboratory A completely equipped process control laboratory has been provided with the latest types of testing equipment. Complete chemical analyses can be run on all types of raw materials and finished cements in a modern, air-conditioned laboratory. The physical testing laboratory has a 100,000-lb. compression machine, a Wagner turbidimeter and Blaine air permeability apparatus for determining cement fineness, together with all other standard testing equipment necessary for meeting ASTM and federal specification requirements. The grinding room is equipped with a laboratory-size tube mill, a jaw crusher and a disc crusher, so that all types of grinding tests can be made to assist the plant operation.

Water The water for plant use—for cooling fan and kiln bearings, burner pipes, etc.—comes from Catawba Creek. A dam built by the company forms a lake of 1,000,000-gal. maximum capacity, enough to insure a year-round supply. A 500-g.p.m. pump supplies water to a 30,000-gal. storage tank. Fresh water for drinking and other uses comes from a deep well and is stored in a 30,000-gal. tank on top of the raw mix silos.

Miscellaneous Concrete is used for practically all construction except the superstructure of the crusher buildings, which are near the quarry. These structures are of steel framing with Johns-Manville Transite siding. The office and laboratory building is of concrete block construction and is air-conditioned. The building housing the services, shops, and parts storage departments has a reinforced concrete skeleton faced with concrete blocks. There are complete locker, shower, and toilet facilities and a completely-equipped first-aid room. On the second floor of the service building is a large meeting room with a seating capacity for 200 employees. The machine shop is equipped to handle all major repairs.

Special attention has been given to lighting and ventilation. Glass blocks are used on the mill and other buildings, and louvres provide ventilation.

A Hough Payloader is used for cleanup work about the plant, and a Towmotor is used to facilitate the handling of large parts.

Acknowledgments The operating and engineering departments of the Lone Star Cement Corp. under the direction of Th. Avnsoe, executive vice-president, Einar Posselt, vice-president in charge of engineering, and Clai-

(*Continued on page* 131)

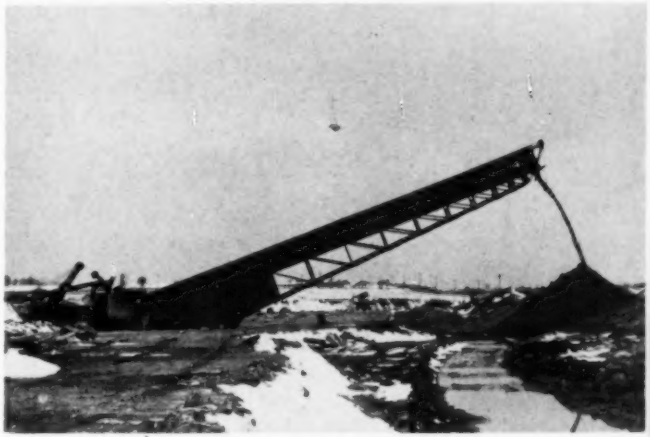
Rock Haulage Problem Solved At Diamond Portland Cement Plant

another P-Q exclusive

BACK in 1892 a shallow stratum of limestone outcropping in the Ohio farmland near Canton was responsible for the formation of The Diamond Portland Cement Company of Middle Branch, Ohio, organized to manufacture and market cement in this rapidly growing industrial area. Now, 59 years later, the formation and characteristics of this same limestone seam have to an unusual degree determined the type of haulage system and method of mining which Diamond has installed in its modernization program.

When the present quarry was opened in 1926, a 36-in. gauge railroad was used for haulage. This railroad consisted of two 20-ton gasoline-powered locomotives, each pulling 14 end-dump cars of 3¼-ton capacity over a distance of 1¾ miles. Since the average depth of limestone is about 12 ft., the quarry face usually extended some 1,500 to 2,000 ft. in length, and the rate of stone depletion from the shallow seam required the track to be moved once each week. After the installation of a third kiln in 1948, which increased annual production capacity by 50 percent, the revision of quarry haulage came into the No. 1 position on the modernization schedule, as the worn-out, overloaded railroad system had well earned its retirement.

Consideration of new standard gauge rail equipment indicated that an extremely high initial investment had been made and there was lack of flexibility in the pit because of the necessity of track moving at the rapidly advancing quarry face.



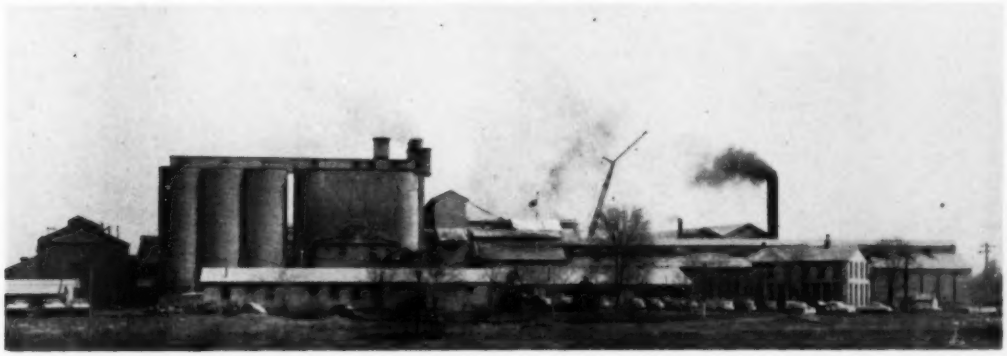
This big elevating conveyor, a stacker, is fed by an electric stripping shovel. It transports the overburden over the wide top of the limestone stratum and deposits it on the previously worked quarry area. This stacker is self-powered, and is supported by two large tracks.

Early estimates indicated that a truck haulage system could reduce the work week in the quarry by at least 50 percent, but there were problems. Underlying the limestone is a seam of coal 2 to 4 in. thick, then a layer of blue fireclay which was considered a major obstacle to satisfactory, low-cost truck haulage.

There was some question as to whether trucks could haul at all through the fireclay. In order to determine this, several types of trucks were brought into the plant for traction and flotation tests.

Truck No. 1 was a conventional two-axle 15-ton truck driving on the rear axle only—in Army designation, a 4 x 2 having 4 wheels and driving on the two rear wheels. Tire size was 14.00 x 24 dual tires on the rear and 12.00 x 24 on the front tires. This truck, powered by a 150-hp. engine, was placed in test hauling, and it was found that the rear drive wheels would not maintain traction on the fireclay.

Truck No. 2 was a tandem-axle truck of 15-ton payload capacity driving on both rear axles (6 x 4). Drive tire size on this truck was 11.00 x 24, and this unit was powered by a 190-hp. diesel engine. While this truck had better traction ability than the 4 x 2 truck, due to power being applied to two sets of drive axles, there was still some dif-



A view of the Diamond Portland Cement Company's plant at Middle Branch, O.

ficulty. The drive wheels lost traction, and the small-size tires tended to cut down through the fireclay.

Truck No. 3 was a 2-axle, 15-ton truck driving on both the front and the rear axle (4 x 4). This truck did the most satisfactory job in its ability to go through the fireclay, but the low haulage speed in the pit, coupled with the probable high mechanical maintenance of the truck operating under these difficult conditions, made the entire installation of truck haulage rather questionable.

However, further studies indicated that because of the shallow limestone stratum, it would be possible to operate the loading shovel down in the usual position on the floor of the pit and still maintain the loading height necessary to load into rear-dump trucks operating on top of the stratum. This had the advantage of keeping the haulage trucks up on a solid foundation. The trucks could operate under good haulage conditions after the average 20-ft. depth of overburden had been removed from the top of the stone.

The trucks selected for this operation were Euclid Model 84FD's with quarry-type rear-dump bodies of 11.1-cu. yd. capacity, struck capacity 30,000 lb. These trucks have 190-hp. diesel engines, 10-speed transmissions, double-reduction planetary-type drive axles, and Vickers hydraulic steering. The front tires are 13.00 x 24, 18-ply; rear tires are 16.00 x 24, 24-ply. Maximum speed is 28.0 m.p.h. and maximum grade ability is 35 percent.

A shot illustrating the loading method. Note the thin limestone stratum. At the left is a motor grader for maintaining roads.

Here a 15-ton unit is dumping a load of rock at the primary crusher.

Because of the long haul over a proposed good haul road, high average travel speeds were considered essential, and trucks were selected with reserve tire capacity and with spring-mounted rear drive axles. Typical off-highway trucks have been built with the drive axle bolted directly to the frame. In recent years, with the improvements of materials used in spring steel and in the methods of spring suspension, spring-mounted drive axles have become more prevalent in the various types of off-highway haulage equipment in order to provide better riding qualities, lower haul road maintenance, and longer tire life.

A time cycle recently taken of the hauling operation readily illustrates the high travel speeds that are maintained. This typical time cycle shows that the average haul speed of the units is 19.4 m.p.h. loaded and 19.7 m.p.h. empty. Cycle distance was 27,012 ft. and the route included a stop each way for a highway crossing.

Since the trucks were to operate over the old railroad bed, hauling a distance of 2.6 miles from the quarry to the primary crusher, the problem of haul road construction was relatively easy. Rail operations terminated at the end of October, 1950, and as the stockpile of crushed limestone was only adequate for eight days of normal plant operation, it was necessary to construct the 13,506 ft. of haul road during this short period. Rails and ties were removed from the old railroad bed, and a 12-ft. roadway with frequent turnout stations for passing was constructed. At one point an 8,000-cu. yd. fill was made to provide better drainage where there had been occasional difficulties with the railway road bed.

The truck haul road was constructed of two 6-in. layers of No. 1 and 2 slag, nominal size 1½- to 3½-in. and bound in with No. 4 slag (¾- to 1½-in). The top surface was finished off and keyed in with No. 7 slag,—½-in. In order to maintain this haul road properly, a Galion motor grader was obtained, and the road is graded daily.

The primary crusher hopper was increased in size to accommodate the 15-ton loads of the trucks.

Actual changeover from rail to truck was accomplished very smoothly. The railroad operators were

given the opportunity to drive the trucks, and driver training was conducted by a serviceman from the equipment distributor.

To be sure that the hauling units were neither underloaded or overloaded and to acquaint the shovel operator and drivers with the appearance of a 15-ton load, one truck at a time was consistently checked on the platform scales. When weight recordings remained constant at rated capacity, this procedure was discontinued, except for an occasional spot check.

Since a repair shop existed for the maintenance of the old railroad equipment, a new structure for truck repair and maintenance was not needed. The building entrance was enlarged and new doors were added. After a small hoist for removing engines had been installed, and the usual automotive tools purchased, the shop was ready for servicing the truck fleet.

The shop crew consists of three men—a foreman, a mechanic, and a mechanic's helper. Every 8 hours all units are thoroughly lubricated and refueled, and all tires are checked for pressure and for cuts and bruises. Every 64 hours engine lubrication oil is replaced and transmission, steering gear, differential, rear axle planetary gears, and hydraulic oil tank are checked for oil level. Normally, air cleaners are cleaned and refilled at this time, but when very dusty conditions exist, this is done more frequently. In addition to 8- and 64-hour checks, 256-hour and a 1,024-hour preventive maintenance checks are also made on the units. These inspections cover items that need only infrequent attention.

The history of each tire is carefully recorded on a tire record card (Fig. 1) furnished by the tire manufacturer.

Each driver fills out a "Driver's Daily Memo" (Fig. 2) at the completion of his shift. This form tabulates the number of working hours of the engine, the number of hauls, fuel consumed, and oil added, as well as any comments relating to adjustments or repairs needed on the vehicle.

Installation of truck equipment at Diamond Cement has resulted in major savings in the work week; it has also reduced the number of employees needed for the hauling operation and at the same time greatly increased the production per shift. Fig. 3 shows the savings made.

Specifically, these figures are 55 percent reduction in work hours per week, 21 percent reduction in haulage manpower, and 102 percent increase in shift production.

As the haul road settles into better condition, and when a stone conveying problem within the plant has been solved, production of limestone from the quarry will be 7,000 tons per 40-hr. week. This will be accomplished with the use of five trucks; a sixth unit will be kept as a standby.

Thus, The Diamond Portland Cement Company has completed another step in its modernization schedule, a step which was thoroughly investigated, carefully planned, and quickly accomplished.

THE DIAMOND PORTLAND CEMENT CO.
MIDDLE BRANCH, OHIO
DRIVER'S DAILY MEMO

DATE _____
SHIFT _____
TRUCK NO _____

		COMMENTS
HOUR METER READING—START		
HOUR METER READING—FINISH		
NUMBER OF WORKING HOURS		
NUMBER OF HAULS		
GALLONS OF FUEL CONSUMED		
QUARTS OF OIL ADDED		

GENERAL REMARKS, ADJUSTMENTS OR REPAIRS NEEDED ON VEHICLE

DRIVER'S SIGNATURE _____

Fig. 2. The Driver's Daily Memo.

RESULTS OF TRUCK INSTALLATION

	RAIL	TRUCKS
WORK WEEK HOURS	108 HOURS	48 HOURS
DAILY MAN-POWER REQUIREMENTS HAULAGE	14 MEN	11 MEN
PRODUCTION PER SHIFT	580 TONS	1170 TONS

Fig. 3. Tabulation of time and labor savings and increased production.

Net sales of $4,045,197 and net income of $635,551 ($6.35 per share) were reported by the Santa Cruz Portland Cement Company for 1950. In 1949 the corresponding figures were $3,819,097, net sales; $787,373, net income; and $7.87 earned per share.

Plants of the Federal Portland Cement Co., Buffalo, N.Y., the National Gypsum Co., Akron, N.Y., and the Universal Atlas Cement Co., Clarence Center, N.Y., have won 100 percent awards in the annual accident-prevention contest sponsored by the Buffalo Chamber of Commerce.

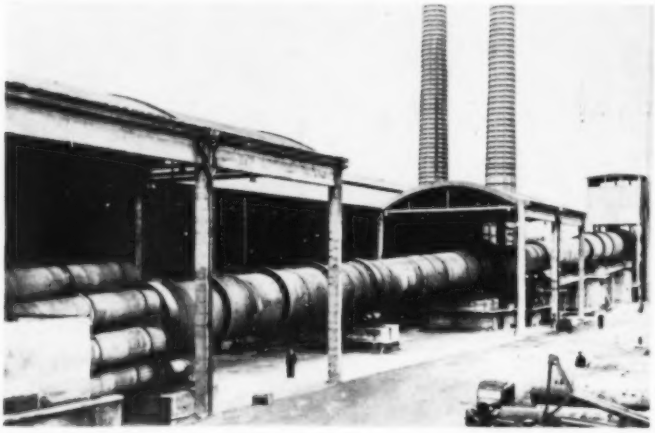
B. F. GOODRICH TIRE RECORD CARD

Tire Brand Number _____ Serial Number _____ _____ Account
Size _____ Const Number _____ Date Received _____

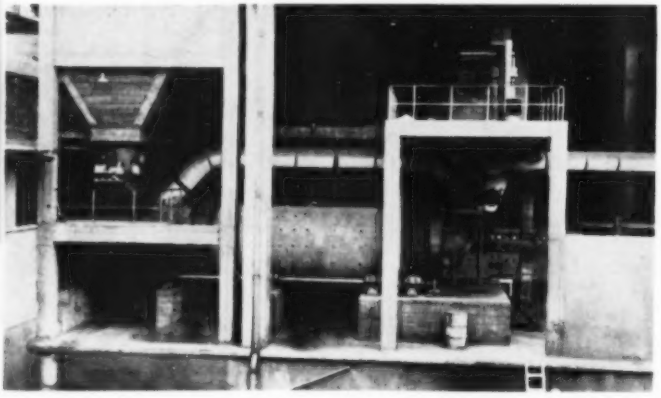
DATE APPLIED	BUS NUMBER	WHEEL POSITION	DATE REMOVED	MILEAGE THIS APPLICATION OR MONTH		ACC MILEAGE	CAUSE OF REMOVAL	COSTS	
				MONTH					

Fig. 1. Tire record card.

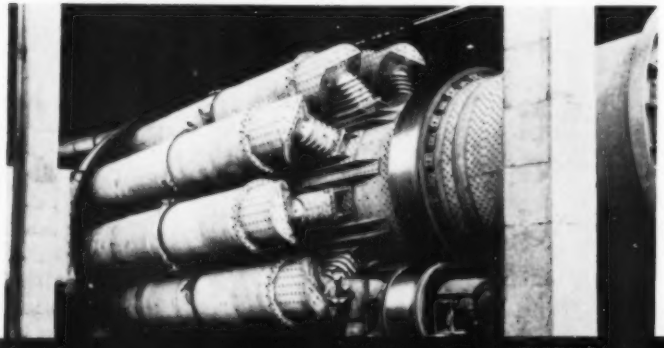
6,000-Barrel Rotary Kiln Starts Production in France



Above: The big kiln at the Lambert plant, with planetary cooler. Below: The mill for drying and grinding the coal, located behind the burner's platform in direct extension of the kiln.



Below: The planetary multitube cooler consisting of 10 cooler tubes. Cooler outlets, at left, are enclosed in a dustproof casing. The man in the foreground shows the size of the unit.



THE French cement company Lambert Frères & Cie. recently put their new 6,000-bbl. rotary cement kiln into production. The kiln is an extension of their factory originally constructed in 1930 and located on the right bank of the river Seine just outside Paris. The order for the new kiln was placed with F. L. Smidth & Co. during World War II, which delayed its execution considerably.

The cement-making machinery in the existing factory, apart from the new kiln and accessories, includes two wash mills followed by two raw mills, each 6 ft. 6 in., by 24 ft., driven by 240-hp. electric motors; two wet process Unax kilns, each 9 ft. 10 in. by 8 ft. 10 in. by 9 ft. 10 in. and 328 ft. long, with a production of up to 400 tons of clinker per day; four Unidan cement mills, two of which are 7 ft. 2 in. by 40 ft., driven by 650-hp. motors, and two 7 ft. 10 in. by 43 ft., driven by 1,000-hp. motors. The cement is packed in paper bags on three rotary Fluxo packing machines, each with a capacity of about 1,600 bags per hour. All mills are driven centrally through Smidth Symetro reduction gear units. After leaving the mills, the cement is cooled in Smidth coolers and transported to the silos by Fluxo pumps.

The new unit is a Unax kiln, provided with a planetary multitube cooler consisting of 10 cooler tubes. The main dimensions of the kiln shell are as follows: length, 445 ft., diameter 12 ft. 4 in., with extended diameter of 15 ft. 1 in. in the drying zone. It is resting on six supports, with an inclination of 5 percent, and is a partly welded, partly riveted job. The cooler outlets for the new kiln are enclosed in a dustproof casing.

The raw materials consist of chalk transported to the factory in barges from the quarry, located some 45 kilometers down the river, and clay, which is excavated as the overburden of the company's gypsum quarry. On account of small quantities of gypsum in the clay, the water content of the slurry cannot be reduced to less than 40 to 41 percent.

The new kiln is provided with a Smidth spiral scoop feeder synchronized for the kiln speed, which is as high as 1.32 r.p.m. Instruments on the centralized control panel at the burner's platform control the measurement of the quantity of slurry feed, its adjustments, and the full control of the feed. The panel also contains all the usual indicators, recorders, and regulating devices for controlling kiln operation.

The fuel used is coal with 3 to 5 percent water, 23 percent gas and 22 percent ashes. It is ground in a direct-firing airswept Tirax mill, provided with a drying chamber and a rotary separator. The mill is 7 ft. 11 in. in diameter, the length being 14 ft. 6 in., with a drying chamber of 7 ft. 11 in., and it rests on two slide shoe bearings. It is driven by a 325-hp. electric motor through a speed reducer connected to the pinion-shaft of the mill.

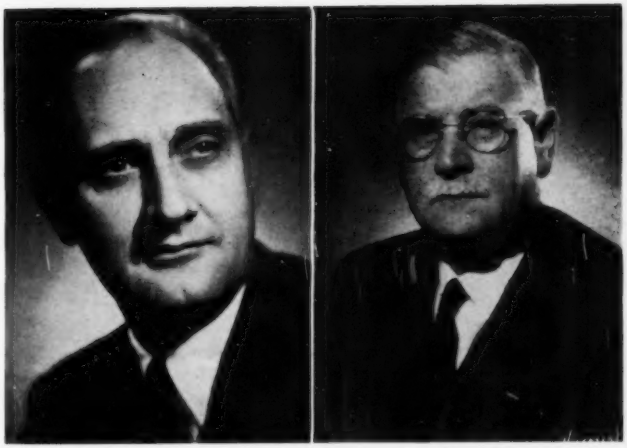
The high-pressure fan for the primary air for the combustion is driven by a 120-hp. variable-speed electric motor. This fan circulates the air through the mill, after which it is used as primary air for the kiln. In order to avoid wear on the fan by taking the pulverized coal through it, the latter is precipitated in a cyclone before passing the fan. It is then fed directly into the primary air after the fan. On account of the vital importance of the fan as regards stoppages, one complete extra fan, with motor, is installed as stand-by.

The raw coal is fed to the mill by two Smidth Pendan feeders from separate hoppers, allowing for coal of two qualities to be used at the same time. These feeders are automatic-extracting, weighing, and recording bands, insuring constant weight of the mill feed. Furthermore, the mill feed is controlled by the Folaphone acoustic control system developed by Smidth.

The kiln is equipped with a chain system in which the water content of the slurry is reduced from 41 percent to about 14 percent. Below the chain system a cross system of special design is installed for further improvement of the heat exchange.

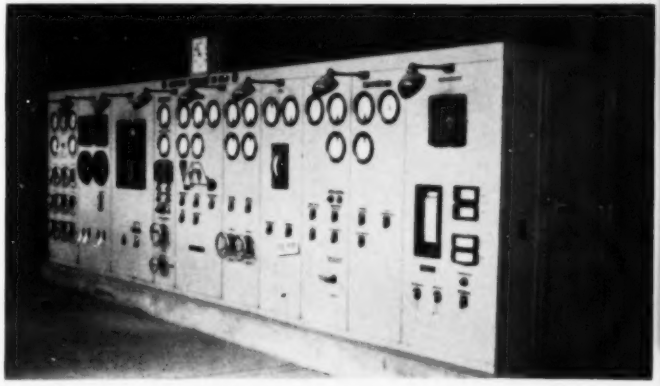
The output of the kiln has been gradually increased since the beginning of this year, and the normal production in continuous operation is now 6,000 bbl. per day, with a heat consumption of 1,475 kg. cal. per kg. clinker or 1,000,000 B.t.u.'s per barrel. For short intervals the kiln has been forced to 6,300 bbl., but until a dust precipitator is installed, the dust loss seems to limit production. However, space has been made available for the installation of electrical dust precipitators.

The kiln operation is very steady, with no ring formation. There is a good protecting coating on the magnesite bricks in the sintering zone.



At left, M. Pierre Lambert, assistant managing partner of Lambert Frères & Cie., and at right, M. Fernand Lambert, managing partner.

Instruments on this centralized control panel, located at the burner's platform, control the measurement of the quantity of slurry feed, its adjustments, and the full control of the feed.



Mark Morton, "Salt King" And Civic Leader, Dies at 92

Mark Morton, best known as the cofounder of the Morton Salt Company and of the Morton Arboretum near Chicago, Ill., died on June 25 at the age of 92. Born at Omaha, Neb., he was the son of J. Sterling Morton, first territorial governor of Nebraska, first secretary of agriculture, and founder of Arbor Day.

Mr. Morton went to work after completing the eighth grade and was employed successively by the Chicago, Burlington & Quincy Railroad, the T. W. Harvey Lumber Company, and a Nebraska City packing firm. In 1885 he and his brother, Joy, organized Joy Morton & Company, a lumber concern. Together they formed the Morton Salt Company in 1902. Mark Morton became vice-president and a director, posts which he held until his retirement 20 years ago.

Mr. Morton was also an executive of various other firms. He was president of the Morton Sand and Gravel Company and also of a cold storage company and a packing concern, and treasurer of the International Salt Company.

He and his brother also donated the land and endowed the Morton Arboretum, an 800-acre tract containing thousands of species of flowers, trees, and shrubs, dedicated to the public.

Actively interested in blooded horses, cattle, and sheep, which he raised on his farm, Mr. Morton was one of the founders of the International Live Stock Exposition. He was also a backer of various civic and cultural organizations.

Sentinels of Safety Trophies Awarded to Mines and Quarries

For working without lost-time injuries and achieving outstanding safety records last year, six mines, quarries, and open pit operations in the United States have been awarded "Sentinels of Safety" trophies in the 26th National Safety Competition conducted by the U. S. Bureau of Mines, according to James Boyd, Bureau director.

Certificates of Achievement in Safety will go to 134 other mines, quarries, and open pits finishing second, third, fourth, and fifth in their respective groups, or who operated 30,000 or more man-hours in 1950 without a lost-time injury, Director Boyd stated.

A total of 566 mines and quarries, working nearly 147,000,000 man-hours, were enrolled in the 1950 competition. This was the second highest enrollment in the 26-year history of the competition, exceeded only by 646 registrations in 1949.

Perfect safety records were reported by 172 of the 566 mines and quarries for last year, but 38 of the perfect operations worked less than the required 30,000 man-hours and were not eligible for the Certificate award.

Award of the "Sentinels of Safety" trophies, donated by *Explosives Engineer* magazine, and of the Certificates of Achievement in Safety, is based upon a tabulation of injury records of competing anthracite mines, bituminous coal mines, metallic and nonmetallic mineral mines, open pit mines, and quarries. The trophies are retained for a year and are transferred to the new winners the following year.

The National Safety Competition, designed to promote safety in the mineral industries of the United States, provides, at plant level, the opportunity for management and labor to co-operate in a program intended to increase the effectiveness of accident-prevention work in mines and quarries. Enrollment in the competition is entirely voluntary. Enrollment applications and rules for the 1951 contest may be obtained by writing to the Accident Analysis Branch, Bureau of Mines, Washington 25, D. C.

Each employee of the trophy-winning plant will be awarded an individual Certificate of Accomplishment for his part in achieving the safety record that won the trophy for his company.

Trophy winner in the underground nonmetallic mines class was The Barberton limestone mine of the Pittsburgh Plate Glass Company, Barberton, O., for working 402,775 man-hours without a lost-time injury.

Rogers City quarry of the Michigan Limestone & Chemical Company, Rogers City, Mich., received a trophy for work-1,273,376 man-hours without a lost-time injury.

Following were the winners of the Bureau's Certificate of Achievement in Safety, awarded for injury-free records or for ranking 2nd, 3rd, 4th, and 5th in their respective groups of the 1950 National Safety Competition. All operations must have worked 30,000 or more man-hours during the year to be eligible for these Certificates.

Nonmetallic-Mineral Mines—Kimballton lime mine, Kimballton, Va., operated by the Standard Lime & Stone Co.

Kimballton lime mine, Kimballton, Va., operated by the National Gypsum Co.

Sugar Creek limestone and shale mine, Sugar Creek, Mo., operated by the Missouri Portland Cement Co.

Winnfield salt mine, Winnfield, Ia., operated by the Carey Salt Co.

Crestmore limestone mine, Riverside, Calif., operated by the Riverside Cement Co.

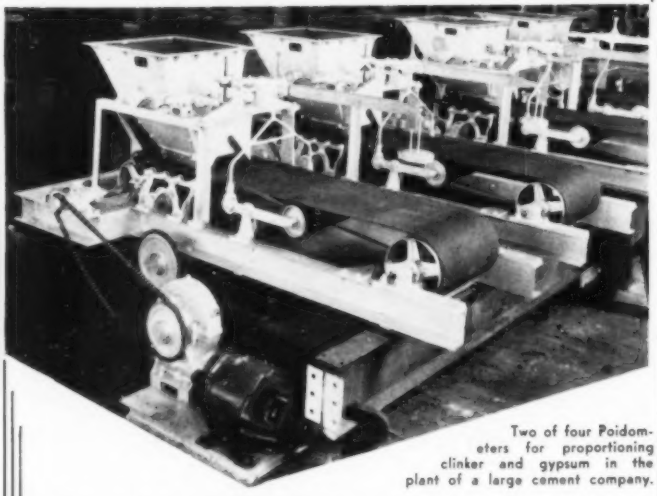
Manheim cement-rock mine, Manheim, W. Va., operated by the Alpha Portland Cement Co.

Grand Rapids gypsum mine, Grand Rapids, Mich., operated by the Certain-teed Products Corp.

Charmian greenstone mine, Blue Ridge Summit, Pa., operated by the Funkhouser Co.

Number 3 shale mine, Hannibal, Mo., operated by the Universal Atlas Cement Co.

OK'd by CEMENT PRODUCERS throughout the world



Two of four Poidometers for proportioning clinker and gypsum in the plant of a large cement company.

SCHAFFER POIDOMETERS

are the preferred scales for leading cement manufacturers everywhere. These tested-and-proven units provide accurate weight-data in all of the processing stages, which may involve weighing, blending, mixing, feeding, recording, and proportioning.

Modern, automatic SCHAFFER Poidometers are a time-saving feature in any plant handling bulk materials.

Simplicity, dependability, precision output and operating economy—these explain the wide-ranging popularity of Poidometers.

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Hutchinson salt mine, Hutchinson, Kan., operated by the Carey Salt Co.

Acme gypsum mine, Acme, Tex., operated by the Certain-teed Products Corp.

Fairmount slate mine, Fairmount, Ga., operated by the Funkhouser Co.

Marblehead agricultural limestone mine, Marblehead, Ill., operated by the Marblehead Lime Co.

Pauway No. 4 phosphate rock mine, Lakeland, Fla., operated by the Davison Chemical Corp.

Bonny Lake phosphate rock mine, Bartow, Fla., operated by the Davison Chemical Corp.

Monsanto phosphate matrix mines, Columbia, Tenn., operated by the Monsanto Chemical Co.

Quarries—Bridgeport limestone quarry, Bridgeport, Pa., operated by the Bethlehem Steel Co.

Columbia limestone Quarry No. 1, Columbia, Ill., operated by the Columbia Quarry Co.

Naginey limestone quarry, Naginey, Pa., operated by the Bethlehem Steel Co.

Bailey Falls limestone quarry, Oglesby, Ill., operated by the Marquette Cement Manufacturing Co.

Number 5 limestone quarry, Hannibal, Mo., operated by the Universal Atlas Cement Co.

Number 4 cement rock quarry, Nazareth, Pa., operated by the Pennsylvania-Dixie Cement Corporation.

Frazier limestone quarry, East Fultonham, O., operated by the Pittsburgh Plate Glass Co.

Steelton limestone quarry, Steelton, Pa., operated by the Bethlehem Steel Co.

Gate City limestone quarry, Gate City, Va., operated by the Pennsylvania-Dixie Cement Corp.

Number 1 limestone quarry, Coeymens, N. Y., operated by the Callanan Road Improvement Co.

Dixon limestone quarry, Dixon, Ill., operated by the Medusa Portland Cement Co.

Ohio dolomite quarry, Millersville, O., operated by the J. E. Baker Co.

Jensen limestone quarry, Riverside, Calif., operated by the Riverside Cement Co.

Fogelsville limestone and cement stone quarry, Fogelsville, Pa., operated by the Lehigh Portland Cement Co.

Klondike limestone quarry, Oro Grande, San Bernardino County, Calif., operated by the Riverside Cement Co.

Wampum limestone quarry, Wampum, Pa., operated by the Medusa Portland Cement Co.

Southwestern limestone quarry, Fairborn, O., operated by the Southwestern Portland Cement Co.

Clinchfield limestone quarry, Clinchfield, Ga., operated by the Pennsylvania-Dixie Cement Corp.

North Branford No. 7 crushed trap rock quarry, North Branford, Conn., operated by The New Haven Trap Rock Co.

Bethlehem limestone quarry, Bethlehem, Pa., operated by the Bethlehem Steel Company.

Billmeyer dolomite quarry, Bainbridge, Pa., operated by the J. E. Baker Co.

Oglesby limestone quarry, Oglesby, Ill., operated by the Lehigh Portland Cement Co.

Gibsonburg lime and limestone quarry, Gibsonburg, O., operated by the Kelley Island Lime and Transport Co.

Martins Creek cement rock quarry, Martins Creek, Pa., operated by the Alpha Portland Cement Co.

Davenport limestone quarry, Linwood, Ia., operated by the Dewey Portland Cement Co.

Nazareth cement rock quarry, Nazareth, Pa., operated by the Lone Star Cement Corp.

Stockertown cement rock quarry, Stockertown, Pa., operated by the Hercules Cement Corp.

Portland limestone and shale quarry, Portland, Colo., operated by the Ideal Cement Co.

Watertown limestone quarry, Watertown, N. Y., operated by the General Crushed Stone Co.

Number 3 cement rock quarry, West Coplay, Pa., operated by the Coplay Cement Manufacturing Co.

Ormrod limestone and cement stone quarry, Ormrod, Pa., operated by the Lehigh Portland Cement Co.

Dallas limestone quarry, Dallas, Tex., operated by the General Portland Cement Co. (Trinity Portland Cement Division).

Monroe crushed stone quarry, Monroe, Mich., operated by the France Stone Co.

Northampton cement rock quarry, Northampton, Pa., operated by the Universal Atlas Cement Co.

Silica crushed stone quarry, Sylvania, O., operated by the Toledo Stone & Glass Sand Co.

Martha limestone quarry, Lebanon, Tenn., operated by the Marquette Cement Manufacturing Co.

Petoskey crushed limestone quarry, Petoskey, Mich., operated by the Petoskey Portland Cement Co.

Oriskany Falls limestone No. 5 quarry, Oriskany Falls, N. Y., operated by the Eastern Rock Products, Inc.

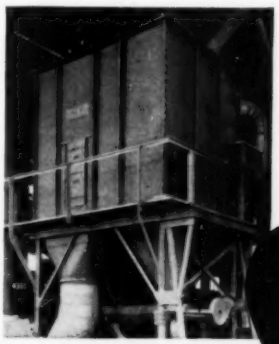

Illustration above shows a Sly Dust Filter in the pack house of a cement plant. Several dust pipes enter the fan side of the filter. The exhaust fan is located on the floor below filter. A screw conveyor automatically and continuously removes the collected cement.

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in **DUST CONTROL**

You, too, Can Benefit by
SLY **GREATER COLLECTING EFFICIENCY**

This is a typical Sly installation. Literally, hundreds of similar installations are in use in connection with production of cement, crushed stone, agricultural limestone, gypsum, asbestos, talc, feldspar, fluorspar, gold, copper and iron ore, diatomaceous earth, bauxite, etc.

Sly Dust Filters collect dust generated in such operations as crushing, grinding, screening, conveying, loading, separating, and mixing — Saving valuable materials, adding to net income.

Sly Filters are saving money for their users by providing cleaner plants, better working conditions, greater production, less cleaning up (interiors, roofs, surroundings, etc.), and cleaner products, which sell better. Thousands of installations.

NOT EXPENSIVE — SLY FILTERS SOON PAY FOR THEMSELVES

Sly Dust Filters get all the dust by filtration through cloth. They offer you:

1. **Greater filtering capacity because of more filtering cloth.**
2. **Taut bags (patented) save power and improve dust removal.**
3. **Bags more easily replaced.**
4. **Automatic control (any degree) minimizes or entirely removes the human factor.**
5. **Simpler shaker mechanism results in savings in maintenance and operation.**

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Greencastle limestone quarry, Greencastle, Ind., operated by the Lone Star Cement Corp.

LaSalle cement rock quarry, LaSalle, Ill., operated by the Alpha Portland Cement Co.

Keystone cement rock quarry, Bath, Pa., operated by the Keystone Portland Cement Co.

Auburn limestone quarry, Auburn, N. Y., operated by the General Crushed Stone Co.

Fort Worth limestone quarry, Fort Worth, Tex., operated by the General Portland Cement Co. (Trinity Portland Cement Division)

Marquette limestone quarry, Earlham, Ia., operated by the Marquette Cement Manufacturing Co.

Inwood limestone quarry, Inwood, Berkeley County, W. Va., operated by the J. E. Baker Co.

Thomaston limestone quarry, Thomaston, Me., operated by the Lawrence Portland Cement Co.

Jordanville limestone quarry, Jordanville, N. Y., operated by the General Crushed Stone Co.

Galloway lime and rock quarry, Galloway, Mo., operated by the Ash Grove Lime and Portland Cement Co.

Keeport crushed stone quarry, Logansport, Ind., operated by the France Stone Co.

Blue Mount trap rock quarry, Blue Mount, Md., operated by the J. E. Baker Co.

Birmingham limestone quarry, Birmingham, Ala., operated by the Lone Star Cement Corp.

Hudson limestone quarry, Hudson, N. Y., operated by the Lone Star Cement Corp.

The MODERN METHOD for ACCURATE WEIGHING of Bulk Materials

MERRICK SCALES

The MERRICK Weightometer* provides an accurate weight record of bulk materials in transit. It is applicable to any size belt conveyor, either inclined or horizontal, and does not interrupt conveyor service. Easily installed, extremely sturdy, and completely reliable.

The MERRICK Feedoweight* is a conveyor type weight feeder that continuously and automatically feeds and weighs uniformly by weight. Extensively used in cement plants for feeding and proportioning raw mix components as well as clinker and gypsum.

*Reg. U. S. Patent Office

MERRICK Weightometers & Feedoweights are important factors in achieving maximum plant efficiency and daily weight records of output wherever bulk materials are handled or processed.

MERRICK engineers, backed by the experience of over 35 years, can supply valuable information on any problem involving feeding and weighing bulk materials. Write for our Bulletins 375 & 551.

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Sylvania limestone quarry, Sylvania, O., operated by the Medusa Portland Cement Co.

Superior limestone quarry, Superior, Neb., operated by the Ideal Cement Co.

Huntington crushed stone quarry, Huntington, Ind., operated by the Erie Stone Co.

Sandt's Eddy cement rock quarry, Easton, Pa., operated by the Lehigh Portland Cement Co.

Genoa dolomitic limestone quarry, Genoa, O., operated by the United States Gypsum Co.

Gibsonburg lime and limestone quarry, Gibsonburg, O., operated by the National Mortar & Supply Co.

National City gypsum rock quarry, National City, Mich., operated by the National Gypsum Company.

Middlefield No. 1 crushed trap rock quarry, Middlefield, Conn., operated by the New Haven Trap Rock Co.

Birmingham cement rock quarry, Birmingham, Ala., operated by the Alpha Portland Cement Co.

Bethlehem cement rock quarry, Bethlehem, Pa., operated by the National Portland Cement Co.

Sugar Creek limestone and shale quarry, Sugar Creek, Mo., operated by the Missouri Portland Cement Co.

Bennie & Harvey monumental stone quarry, Lexington, Ga., operated by the Bennie and Harvey Co.

Thomasville crushed stone quarry, Thomasville, Pa., operated by the J. E. Baker Co.

Zanesville limestone quarry, White Cottage, O., operated by the Sidwell Brothers Co.

Devil's Slide limestone quarry, Morgan, Utah, operated by the Ideal Cement Co.

Iola limestone and shale quarry, Iola, Kan., operated by the Lehigh Portland Cement Co.

St. Cloud ballast granite quarry, Waite Park, Minn., operated by the Shiely-Petters Crushed Stone Co.

Lehigh limestone and Brownstown shale quarry, Mitchell and Brownstown, Ind., operated by the Lehigh Portland Cement Co.

Charmian greenstone quarry, near Blue Ridge Summit, Pa., operated by the Funkhouser Co.

Marquette limestone quarry, Cape Girardeau, Mo., operated by the Marquette Cement Manufacturing Co.

Spencer crushed stone quarry, Spencer, Ind., operated by the France Stone Products, Inc.

Union Bridge limestone quarry, Union Bridge, Md., operated by the Lehigh Portland Cement Co.

Bluffton crushed stone quarry, Bluffton, Ind., operated by the Erie Stone Co.

Howes Cave limestone quarry, Howes Cave, N. Y., operated by the North American Cement Corp.

Evansville cement rock quarry, Evansville, Pa., operated by the Allentown Portland Cement Co.

Boettcher limestone and shale quarry, Ft. Collins, Colo., operated by the Ideal Cement Co.

Evans limestone quarry, Evans, Wash., operated by the United States Gypsum Co.

Number 4 trap rock quarry, Knippa, Tex., operated by the Southwest Stone Co.

Knoxville lime quarry, Knoxville, Tenn.,

operated by the Standard Lime and Stone Co.

Elberton dimension granite quarry, Elberton, Ga., operated by the Dixie Granite Quarriers.

Middle Falls crushed stone quarry, Middle Falls, N. Y., operated by the Hudson Valley Sand & Stone Co.

Montgomery trap rock quarry, Montgomeryville, Pa., operated by the Montgomery Stone Co.

Georgetown limestone quarry, Georgetown, O., operated by Hanna Coal Co.

Lone Star, Va.

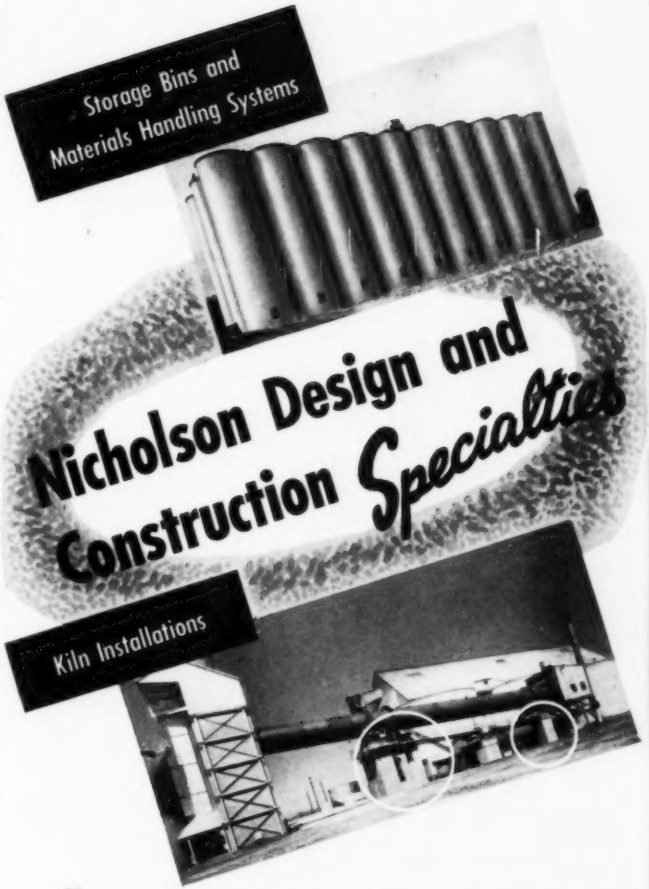
(*From page* 122)

bourne Van Zandt, chief engineer, designed the plant with the cooperation of the engineering staffs of several machinery manufacturers and subcontractors.

The contractors for the construction of this plant were the Walsh Construction Company in conjunction with the Ralph E. Mills Company. The Macdonald Engineering Company prepared the design details and supervised the erection of the raw blending silos, the cement storage silos, and the packhouse under a subcontract. The Austin Company prepared the design details for the office, laboratory, and service buildings. The Roberts & Schaefer Company developed the details of the mill, storage, and kiln buildings. The combined mill and storage buildings have two 75-ft.-span, parabolic arch, monolithic thin-shell concrete roofs.

The Allis-Chalmers Mfg. Company supplied most of the major equipment including the primary crusher, the two raw ball mills, the two rotary kilns, the three finish compeb mills, and most of the major electrical equipment including the mill motors. General Electric supplied some switchgear equipment, as well as most of the small motors and gearmotors. The Metropolitan Electric Company fabricated the multi-unit control and distribution stations and the kiln control panels. The Fuller Company supplied the coolers, cement pumps, rotary compressors, Airslides, and rotary valves. The Link-Belt Company supplied the screw conveyors and related equipment; the Kensington Steel Company supplied the drag chains and elevator chains; and the Chain Belt Company supplied the pan feeders, belt conveyor idlers and pulleys, and drive chains and sprockets for the elevators. Both Goodyear and Republic conveyor belts are used.

The construction of this plant and the installation of all equipment was under the direct supervision of



The cement industry has long identified the name Nicholson with well-designed and well-constructed storage bins and materials handling systems. Ours is a service that goes back *nearly forty years* and is responsible for many of the largest installations in the country, not only in the cement industry but wherever bulk materials are stored and handled.

Lately, we have been called upon to take care of several kiln installation jobs ... a natural development since it is based on our extensive knowledge of and experience with concrete construction and the installation of heavy equipment involved.

Storage bins and kiln installations are merely two suggestions. Our engineering department will be glad to work with you on *any* concrete construction project you may have under consideration.

THE NICHOLSON CO.

10 Rockefeller Plaza, New York 20, N. Y.

Herman Ursprung, project manager, who is now domestic operations manager for all Lone Star plants in this country. Stewart S. Fritts was project field engineer and Einer Anderson was construction superintendent. Roy A. Rasmussen is plant superintendent; W. J. Kendrick is division chief chemist; and Homer Schick is plant chief clerk.

Sulphur Production Sets New U. S. Records in 1950

All-time records for sulphur production were broken in 1950, when 5,192,184 long tons were mined. This is a 7 percent increase over the previous record in 1948, and a gain of about 447,000 long tons over 1949.

December production rose to 435,290 tons, a figure exceeded by only six other months, and reversing the trend of the previous two months.

According to the Federal Statistical Office, considerable gains were made by the West German building materials industry during March. Cement production during that month amounted to about 985,000 tons, an increase of 220,000 tons over the February output and 475,000 tons above the production total for March, 1950.

for better masonry cement at lower cost . . .

airalon is a ready-to-use air entraining agent and plasticizer formulated especially for masonry cement. It contains, in one easy-to-handle compound, the saponified resin acids and fatty acids necessary to make a high quality masonry cement.

airalon is economical to use. It enables the cement maker to produce his present quality masonry cement at lower cost . . . or to produce a higher quality masonry cement at no increase in cost. Because **airalon** is added at the cement mill as received, in liquid form, it simplifies problems of inventory, handling, and storage. In addition, **airalon** is an excellent grinding aid.

airalon has been exhaustively tested in our own laboratories and in extensive commercial use . . . is accepted by ASTM under Cement Specification C 175-48T.

DEWEY AND ALMY CHEMICAL COMPANY
Cambridge 40, Mass. Chicago 38 San Leandro, Calif. Montreal 32

Newfoundland Govt. Sponsors $3,000,000 Cement Plant

The Newfoundland provincial government has announced the earmarking of $3,100,000 from the provincial treasury for constructing and equipping a cement plant. The facilities will be turned over to a private company—reported to be the Cement & Development Corporation of New York—for operation, with the government and the company sharing profits.

The new plant, now under construction at Corner Brook, Newfoundland, will serve the cement needs not only of Newfoundland, but also of Cape Breton Island and possibly Prince Edward Island and the section of Nova Scotia near the mainland.

13th Technical Bibliography Now Available from OTS

The *Subject Index to Volume 13 Bibliography of Technical Reports* is now available from the Office of Technical Services, U. S. Department of Commerce, at $1 per copy.

The *Bibliography of Technical Reports*, issued monthly, lists additions to the 150,000-document Office of Technical Services collection of foreign and domestic reports. Together with the *Technical Reports Newsletter*, it helps provide American business firms with the highlights of federal and non-confidential technical research.

Maine Governor Legalizes Prospecting for Minerals

Governor Payne recently signed into Maine law a bill designed to encourage prospecting for minerals and metals.

The new act allows prospectors to enter state-owned or private lands, with written permission, to seek mineral deposits. Such prospectors will be entitled to 5 percent of the profits from development of any minerals they find for a 20-year period.

Minerals Yearbook Preprint Presents '49 Gypsum Output

The chapter on gypsum in the 1949 *Minerals Yearbook* has been preprinted in pamphlet form by the United States Department of the Interior. The complete volume may be purchased from the Superintendent of Documents, Washington 25, D.C., at a date to be announced later.

Prepared by Joseph C. Arundale and M. G. Downey, the chapter presents a general summary and sections on domestic production, consumption and uses, prices, foreign trade, technology, and world review. Graphs and tables show trends and significant factors.

A contract for a $5,000,000 extension to the plant of the Canada Cement Company Limited at Exshaw, Alberta, has been awarded to Pool Construction Limited, it was reported.

Publish Third Edition Of Industrial Safety Book

A completely revised new third edition of *Industrial Accident Prevention*, containing four new chapters, has been published by the McGraw-Hill Book Company. The author is H. W. Heinrich, assistant superintendent, Engineering and Inspection Division, The Travelers Insurance Company.

It is brought out in this analysis of accident prevention that hidden, incidental costs of accidents in industrial work average four times the direct cost of compensation and medical bills. The author undertakes to indicate what remedies to choose and how to get them to work. Included in the volume are changes and improvements in the existing A.S.A. accident cause code. Published by McGraw-Hill. Price, $5.50 per copy.

'50 Cement, Gypsum Totals Of Britain Top 1949 Output

According to the British magazine, *Cement, Lime, and Gravel*, the English production of cement in 1950 was 9,950,000 British tons, with 1,816,000 tons exported. This compared with 9,214,000 tons produced in 1949, and 1,844,000 tons exported.

The same source states that the English production of gypsum in 1950 totaled 1,167,000 British tons, as compared with 1,085,000 tons in 1949.

New York 1950 Public Works Top City's 1949 Record

The annual report of Commissioner Frederick H. Zurmuhlen, New York City's Public Works, indicates that the city's Department of Public Works set records in design and construction last year.

Value of construction completed by the city in 1950 was $39,358,000, as compared with $36,605,000 in 1949, and $15,466,000 in 1948. Designs finished in 1950 provided for ultimate construction worth $74,670,000, as compared with $44,200,000 in 1949.

Iron Blast-Furnace Slag Output Establishes New Record in 1950

A record output of 24,926,033 short tons, valued at $29,480,858, was established by the iron blast-furnace slag industry in 1950.

Screened air-cooled slag, the major production, reached a new total of 20,047,844 short tons, an increase of 13 percent over the 1949 figure. Of this total, 89 percent was used as railroad ballast, aggregate in portland cement concrete, bituminous construction of all types, and miscellaneous highway construction uses.

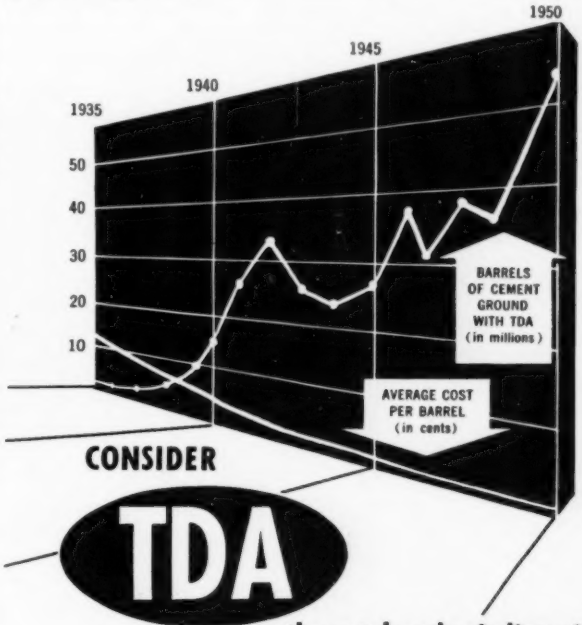
Unscreened air-cooled slag processed during the year showed a substantial increase in output as 1,005,436 short tons, valued at $639,499, were processed. As in former years, this material was utilized in highway construction other than portland cement concrete and bituminous construction, and for railroad ballast and other uses.

About half of the granulated slag was used in the manufacture of hydraulic cement. However, virtually the entire output of expanded slag was used as aggregate in the manufacture of concrete block.

American Aggregates Corporation, Greenville, Ohio, reported a 1950 net income of $1,163,952 equal to $5.94 a share of common stock. Net sales were $5,815,246. This compared with the 1949 net profit of $1,013,656, or $5.14 a share on sales of $5,098,582.

During 1950 the cement production in Spain was reported to have increased by 13 percent over the figure for 1949. Production was 1,970,000 tons of clinker, as compared with 1,740,000 tons in 1949), 1,910,000 tons of portland cement (1,670,000 tons in 1949), and 167,000 tons of other types of artificial cements, a figure approximately the same as for 1949.

The shaft of a 225-ft. reinforced concrete chimney has been completed for Federal Portland Cement Co. in Woodlawn, N. Y., by Rust Engineering of Pittsburgh. The chimney will serve Federal's new 375-ft. cement kiln.



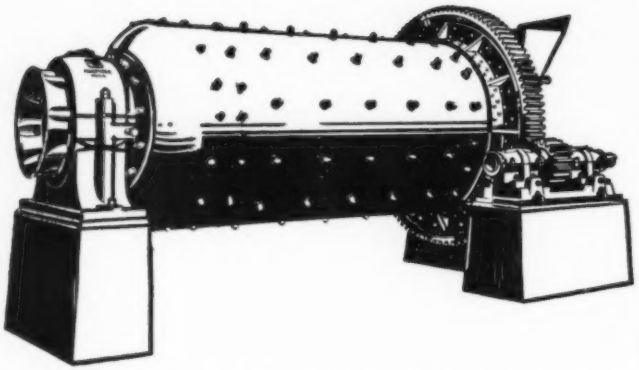
the catalyzed grinding aid . . .
used in over 300 million barrels of cement

With **TDA**, you're sure to get top performance out of your mill. Look at the facts: **TDA** increases grinding rates of Type 1 cement 15 to 20%, of Type 2 cement 20 to 25%, of Type 3 cement 25 to 50%. In closed circuit grinding, the dry dispersing effect of **TDA** can increase separator efficiency, resulting in even greater production.

Production goes up with **TDA**, but costs stay way down. Cement mills report they are able to use less **TDA** per treated barrel than ever before, and still get the same increase in grinding efficiency. **TDA** pays its own way. Its cost is amortized as you use it, and you use it only when you need it.

Remember, **TDA** gives the same or better quality product . . . **TDA** works well with all types of portland cement, as well as with puzzolanic and natural cements.

DEWEY AND ALMY CHEMICAL COMPANY
Cambridge 40, Mass. Chicago 38 San Leandro, Calif. Montreal 32



Fresh off the press ! !

TECHNICAL BULLETIN ON . . .

ROD MILLS

The controversial issue of "when to use Rod Mills" is thoroughly discussed in this new Hardinge Bulletin (No. 25-C-8). It includes much "meaty" information on the general subject of rod milling and the proper field of application for Rod Mills.

Specific details of Hardinge Rod Mill construction, sizes, and other specifications are, of course, included.

Write for your copy today.

At the right is an interior view of the largest Rod Mill in existence — an 11½" diameter Hardinge Rod Mill — showing lifter-bar lining and rods.

Write for Bulletin 25-C-8.

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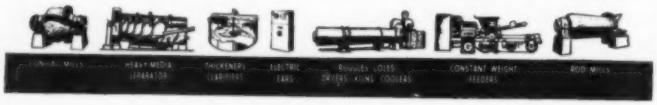


Standard Fineness Sample Offered by Standards Bureau

The National Bureau of Standards is now making available a new standard fineness sample for the calibration of instruments used in testing portland cements and related materials. The new sample, Portland Cement Standard Fineness Sample No. 114G, is applicable to the Wagner turbidimeter, the Blaine air-permeability fineness meter, and the No. 325 sieves.

NBS first began the issuance of standard fineness samples for sieve calibration in the portland cement industry over 35 years ago. With the development of other instruments for determining the fineness of portland cement, new standard fineness samples have been issued from time to time for the calibration of these instruments. Whereas the various devices for measuring fineness can generally be calibrated from the constants of the instruments, the use of standard samples make the calibration easier and brings the results of tests in different laboratories into closer agreement.

Orders for NBS Portland Cement Standard Fineness Sample No. 114G should be sent to the National Bureau of Standards, Washington 25, D. C., accompanied by payment in advance. The cost of a 12-gram sample is $2.50. Remittances should be payable to the National Bureau of Standards. When ordering, specify both name and number of the sample.

Asbestos Output Large in 1950 Sales Value Highest Ever

Both production and shipments of asbestos in the United States were a little lower in 1950 than in 1949, according to reports by producers to the U. S. Bureau of Mines. High prices were reflected in a sales value that surpassed all previous records. Chrysotile was produced in Vermont and Arizona, and amphibole sales were reported from California, Georgia, North Carolina, and Oregon. Demand was exceptionally strong, and imports reached an all-time high.

Canada supplied the major part of the imports, but important contributions, particularly of the strategic grades, were made by Africa. Southern Rhodesia furnished most of the low-iron chrysotile required for certain electrical applications. South Africa supplied all of the amosite, and most of the crocidolite (blue asbestos) consumed in the United States.

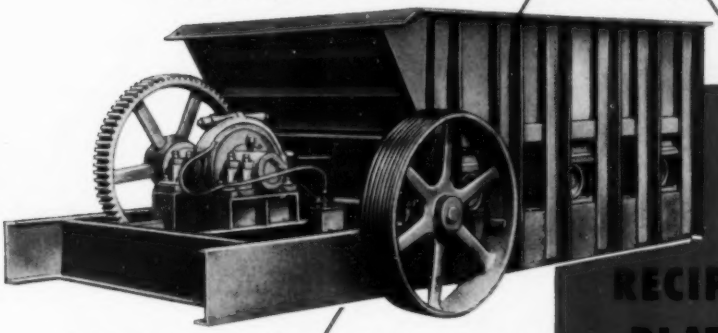
In 1949 domestic asbestos produced totaled 42,918 short tons (valuation unavailable); tonnage sold or used by producers was 43,387, valued at $2,614,416. Comparable figures for 1950 were 41,358 short tons produced (valuation unavailable); 42,434 tons sold or used by producers, valued at $2,925,050.

According to the New York Stock Exchange, stockholders of the Lone Star Cement Corporation approved a proposal to split the company's common stock into three shares of $10 par value for each share of present no-par common.

A Great Combination..

For Low Cost Handling and Crushing Operations!

A combination of McLanahan Reciprocating Plate Feeder and Rockmaster Crusher is your answer to most economical feeding and crushing of 1000 tons or more of limestone, ore or rock per hour. Equipment can be furnished as component parts or as separate units to best suit your application.



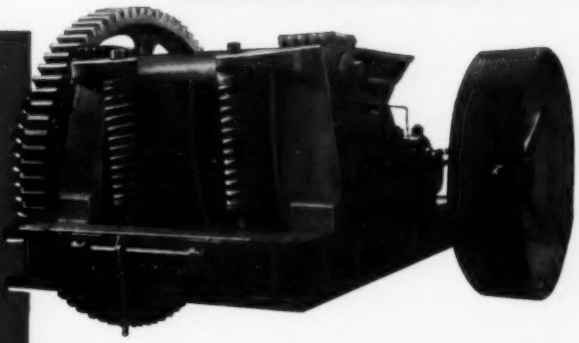
1

McLANAHAN
Heavy Duty
RECIPROCATING PLATE FEEDER

Built to handle materials from the size of sand to shovel-loaded rock, McLanahan Adjustable Reciprocating Plate Feeders automatically control the rate of flow of material, and are quickly adapted to the producing capacity of any machine.

2

McLANAHAN
Single Roll
ROCKMASTER CRUSHER

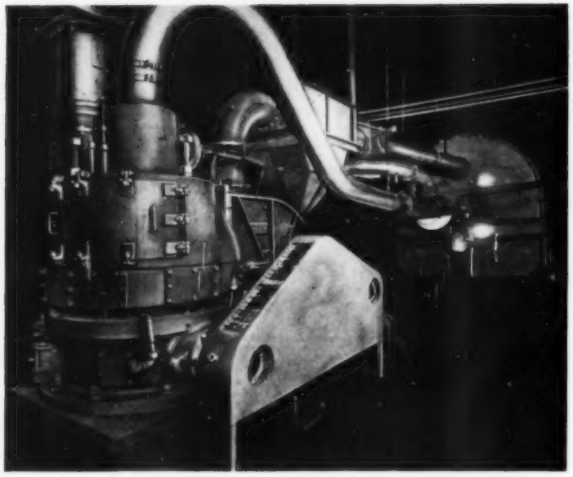


The McLanahan Rockmaster Crusher is the economical solution to most any crushing problems. Greatest savings can be achieved by this combination of equipment. Outstanding for primary and secondary crushing operations, for use on limestone, gypsum, rock, gravel, shale, iron ore, slag and other materials.

Write Today
For Bulletins
RM-505 and FRE-4812

McLANAHAN & STONE CORPORATION
Pit, Mine and Quarry Equipment Headquarters
Hollidaysburg, Pennsylvania

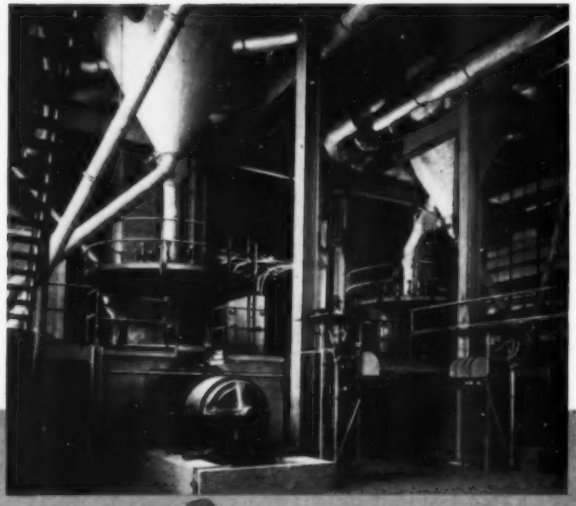
Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.



B&W DIRECT-FIRING FOR KILNS

The ultimate in kiln firing is obtained with the B&W Direct-Firing System, using the B&W Type E Pulverizer.

This system provides: (1) High availability; (2) Low operating costs; (3) Uniform delivery of coal; (4) Low rate of wear on grinding elements — hence low maintenance; (5) Ability to handle high-moisture coals.



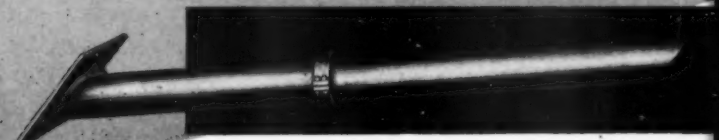
B&W CLOSED-CIRCUIT RAW GRINDING SYSTEM

High grinding efficiency, high fineness and low power consumption characterize the B&W Pulverizer for raw material grinding. It is widely and successfully used for pulverizing cement rock, limestone, shale, phosphate rock, ores, and other materials. Drying can be accomplished within the system.

Power requirements are low and efficiency is high. Low maintenance and minimum floor space are also features.

B&W NOSE-RING CASTINGS

These castings are demonstrating outstanding ability to outlast conventional design by wide margins, reduce kiln maintenance, and prevent costly shutdowns; belling out of kiln shell is eliminated, resulting in maximum nose brick life; protecting flange on casting permits use of low-alloy steel bolts.



B&W KILN FEED PIPES

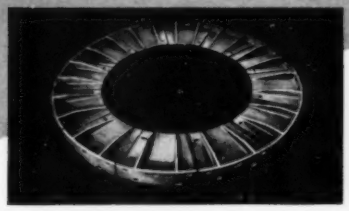
These feed pipes are widely used in cement plants because of their resistance to both heat and destructive abrasion. A central C clamp permits renewal of the lower portion if necessary.

C-200 T

follow these 6 steps

TO PRODUCTION ECONOMIES

A step toward reduced operating costs will be found in the use of B&W products; all have long, outstanding records of dependable service.



B&W WEAR-RESISTANT CASTINGS

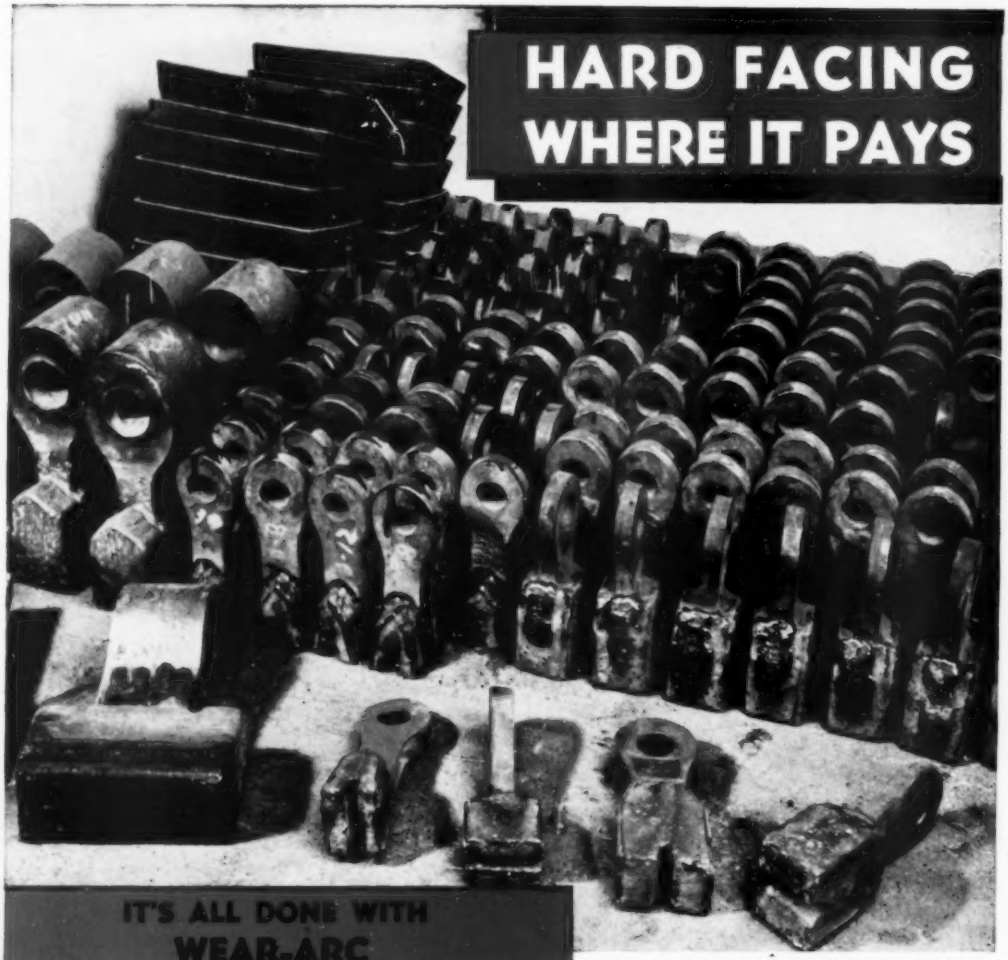
Chilled iron and alloy steel liners, roll heads, slugger plates and other B&W wear-metal castings are CAST TO LAST . . . keep grinding and crushing equipment on the job . . . prevent unscheduled shutdowns for costly, time-consuming repairs and replacements.

B&W RETAINING RING CASTINGS

These tail ring castings give long and economical service at feed-ends of rotary kilns in temperatures exceeding 1200 F. They provide proper size kiln openings without special installations and cutting of bricks. Overlapping segments eliminate spillage of raw materials in dust chamber, and reduce stack losses. Provision for ample expansion eliminates bell-mouthing and consequent effect of kiln sealing.

BABCOCK & WILCOX

HARD FACING WHERE IT PAYS



IT'S ALL DONE WITH WEAR-ARC

Elevator buckets of cast steel (annealed) are hard faced on the top wearing edge with WEAR-ARC 12 to increase life against impact and abrasion. Ninety-five pound hammers for the impactor, 10 lb. and 20 lb. hammers for the hammermills, and dipper and shovel teeth are all built up with WEAR-ARC WH and hard faced with WEAR-ARC 12 to increase life as much as three times under severe impact and abrasion.

To reclaim worn equipment and hard face against excessive wear, you will find one, or a combination of two, of the seven basic WEAR-ARC hard facing electrodes does the best job . . . increases life as much as four times or more.

WEAR-ARC WH is ideal for build up on manganese steel; WEAR-ARC 12 for providing that hard wearing surface.

Ask for bulletin No. 10550, illustrating and describing properties and welding procedures for the complete line.

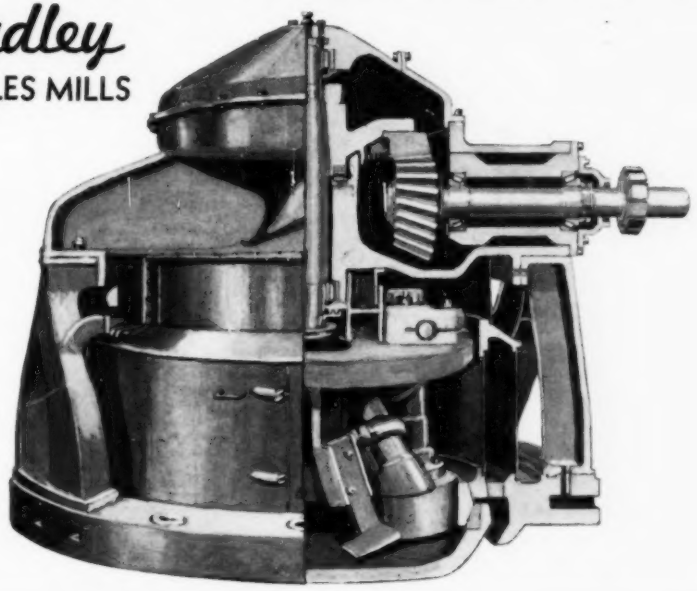
"I Like the rod that comes in the RED can"

SEE YOUR NEAREST ALLOY RODS DISTRIBUTOR

ARCALOY for stainless steel
NICKEL-ARC for cast iron
TOOL-ARC for tool steel
WEAR-ARC for hard facing
BRONZE-ARC for general use

ALLOY RODS CO. York, Penna.

Bradley
HERCULES MILLS



The Quickest and Most Economical Way to Increase Your Grinding Capacity

For the cement manufacturer with excess kiln capacity—operating compartment mills—the installation of BRADLEY HERCULES MILLS as preliminary pulverizers and converting the compartment mills to straight tube mills will result in INCREASED CAPACITIES of uniformly ground fine materials at an APPRECIABLE SAVING IN HORSE POWER.

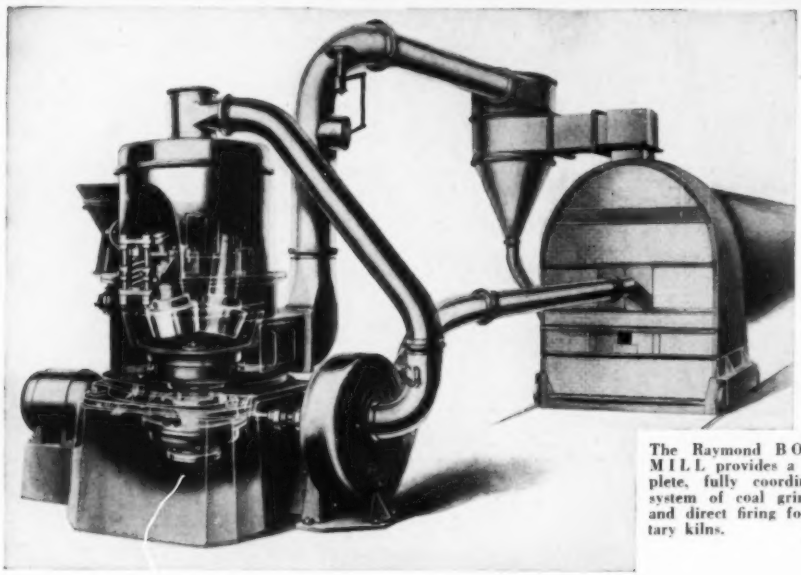
Investigate the new HERCULES MILL, a moderate priced mill, that can be installed in practically any existing plant at GREAT SAVINGS in horse power with increased capacities. A RUGGED MILL—designed for MAXIMUM ACCESSIBILITY — the use of new wear-resisting metals ASSURES CONTINUITY OF OPERATION.

Never in the history of the Cement Industry has there been as much interest in Bradley Hercules Mills for preliminary grinding. Almost every month new converts are won over to double stage reduction of cement materials.

Write for Catalog No. 60.

BRADLEY PULVERIZER CO.
ALLENTOWN, PENNSYLVANIA

HOW BOWL MILL FIRING



The Raymond BOWL MILL provides a complete, fully coordinated system of coal grinding and direct firing for rotary kilns.

264 UNITS SINCE 1935 (For Kiln Firing Alone)

THE outstanding success of the RAYMOND BOWL MILL is measured by the steadily increasing number of these modern direct-firing units installed each year in the Cement, Lime, Burned Dolomite, and similar fields, pulverizing coal for firing rotary kilns.

The graphic record on the opposite page tells the story. From the first three units installed in 1935, the number of Bowl Mills in operation has grown to 264 units installed up to January, 1951. These mills have a total rated capacity of approximately two-and-one-half million pounds of coal per hour, for firing rotary kilns alone.

Raymond leadership is based on dependable performance, year after year, and is maintained by the proved ability of the Bowl Mill to reduce over-all costs and insure top efficiency in kiln operation.

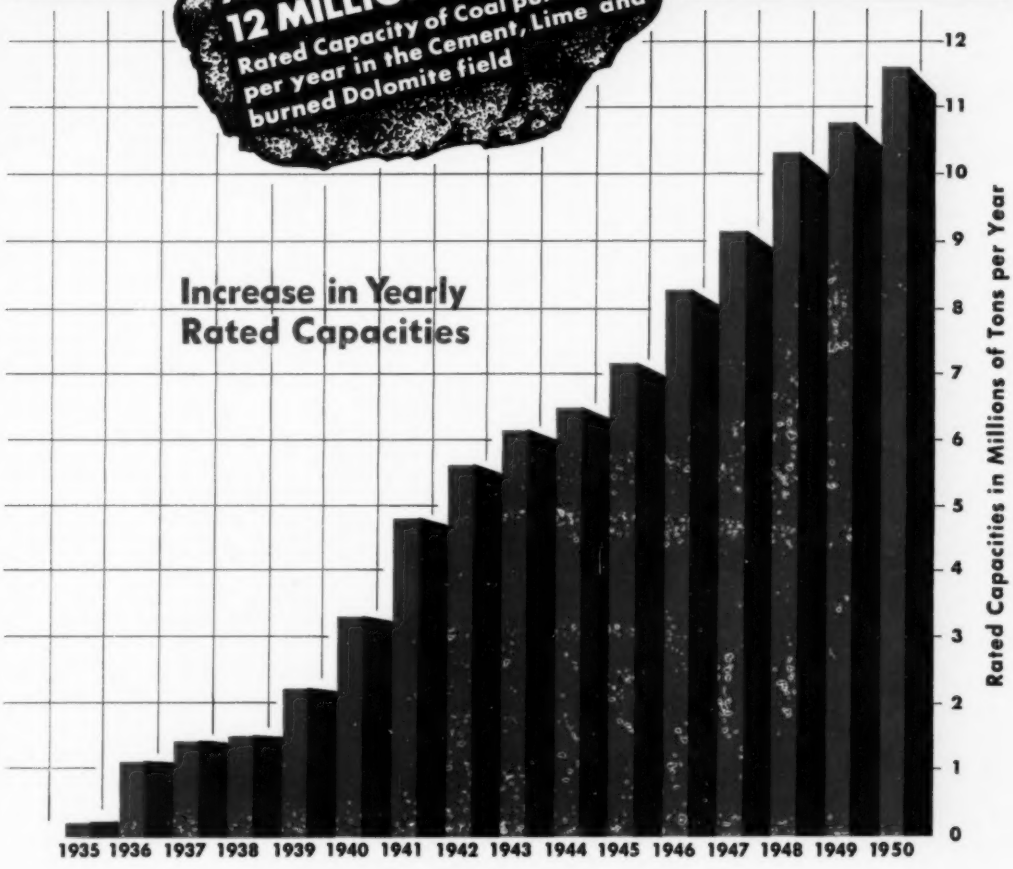
Write for the Raymond Catalog No. 62, for full details on the BOWL MILL

COMBUSTION

Sales Offices in Principal Cities

HAS GROWN IN 16 YEARS

ALMOST . . .
12 MILLION TONS
Rated Capacity of Coal pulverized per year in the Cement, Lime and burned Dolomite field



GROWTH OF BOWL MILL FIRING BY YEARS

ENGINEERING-SUPERHEATER, INC.
RAYMOND PULVERIZER DIVISION
1321 North Branch Street • Chicago 22, Illinois

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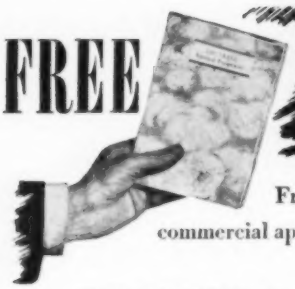


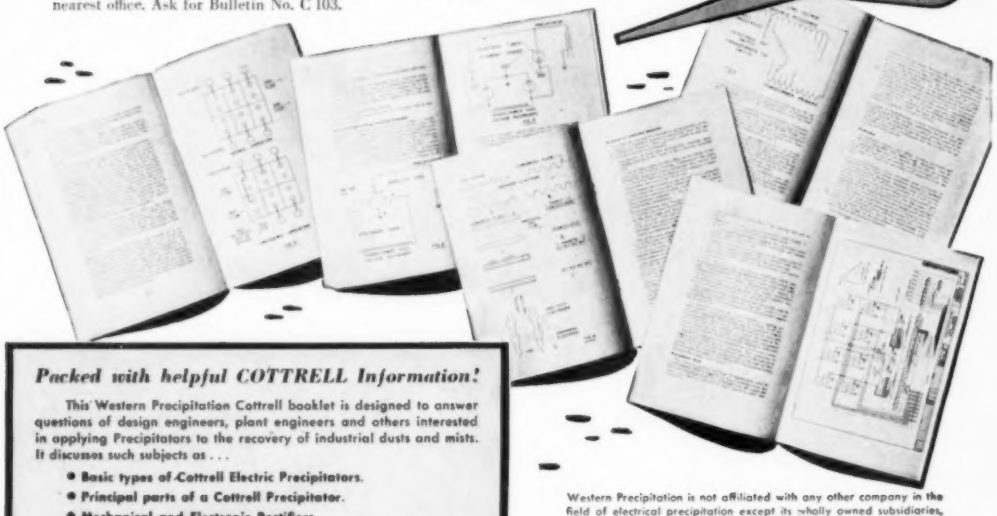
From Western Precipitation—the organization that pioneered the commercial application of Cottrell Precipitation...

IF YOU ARE ENGAGED in any phase of industry where the recovery of dusts, fumes, fly ash, mists, fogs or other suspensions from gases is a problem, you will find this booklet on the COTTRELL Electrical Precipitator helpful and informative.

Western Precipitation pioneered and installed the first commercial application of the well-known COTTRELL Electric Precipitator—Dr. Cottrell, the inventor, being a member of the company. And for more than 42 years Western Precipitation has consistently led in developing new COTTRELL advancements and techniques for recovering suspensions from gases, both wet and dry.

This 28 page booklet summarizes many of the basic facts you should know about modern COTTRELL Precipitators—the various types available, how they operate, principal types of electrode systems and rectifiers, shell constructions, etc. As long as the supply lasts, a free copy will be sent you on request to our nearest office. Ask for Bulletin No. C 103.

28 PAGES
of helpful facts to know about
COTTRELL ELECTRICAL PRECIPITATORS



Packed with helpful COTTRELL Information!

This Western Precipitation Cottrell booklet is designed to answer questions of design engineers, plant engineers and others interested in applying Precipitators to the recovery of industrial dusts and mists. It discusses such subjects as . . .

- **Basic types of Cottrell Electric Precipitators.**
- **Principal parts of a Cottrell Precipitator.**
- **Mechanical and Electronic Rectifiers.**
- **Various types of Collecting Electrodes (rod curtains, corrugated plates, dual plates, pocket electrodes, etc.).**
- **Removal of Collected Material.**
- **Factors in Shell Construction (steel, concrete, brick, etc.).**
- **Operating Efficiencies and the Effect of Various Factors on Performance.**

. . . and many other basic Cottrell facts. Write for your free copy of Bulletin C103 today while supplies are adequate!

Western Precipitation is not affiliated with any other company in the field of electrical precipitation except its wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. Whether you are now contemplating the installation of a Cottrell Electrical Precipitator, or may be interested in such an installation at a future date, we can and will serve you in any part of the United States or other countries.

NOW SELLING...

COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers

...in all parts of the U. S. A. and foreign countries.

WESTERN Precipitation CORPORATION

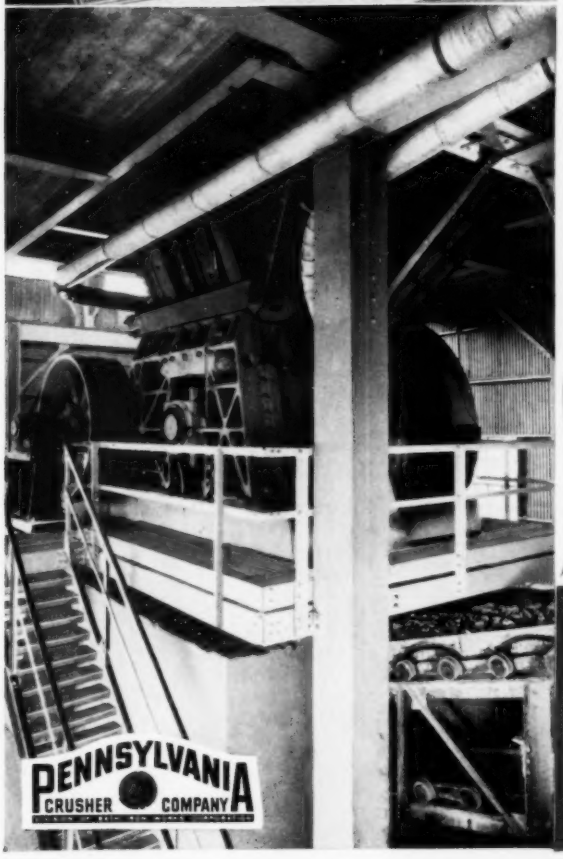
ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1015 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 LaSALLE ST. BLDG., 1 N. La SALLE ST., CHICAGO 2 • HOBART BUILDING, SAN FRANCISCO 4, CALIFORNIA
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

BIG CAPACITY!

Up to 1000 Tons Per Hour . . .

but operating costs are low with a Pennsylvania Primary Single Roll



In cement, gypsum, and stone crushing plants throughout the country, Pennsylvania Penn-Lehigh Primary Single Rolls are crushing big tonnages day after day at remarkably low cost to their operators. Secret of Penn-Lehigh's huge capacity is the continuous nipping action of the powerful roll teeth that keeps drawing the rock in, crushing 100% of the time, even when choke fed with sloppy or frozen material. Unlike jaw crushers, which waste power on the recovery stroke and crush only about 50% of the time, Penn-Lehigh Single Rolls use power for *active crushing only.* This, plus the economical 40-50 RPM roll speed, keeps your power costs *low*—as low as ⅓ HP per ton!

As for maintenance, one Penn-Lehigh, over a 20-year period, showed a parts replacement cost of only $.0005 per ton—and that record's not unusual because Penn-Lehighs are massively Steelbuilt throughout, with every part designed for overload service. For primary crushing of Cement Rock, Limestone, Gypsum and similar friables to a nominal 6″ product in one pass, you can't beat a Penn-Lehigh for big capacity at low cost. Write for Bulletin 2003.

PENNSYLVANIA CRUSHER COMPANY, *Division of Bath Iron Works Corporation,* 1713 Liberty Trust Building, Philadelphia 7, Penna. Representatives in New York—Boston—Pittsburgh—Birmingham—Roanoke—Detroit—Chicago—St. Louis—Crosby, Minn.—Los Angeles—London, England.

PENNSYLVANIA
Penn-Lehigh
SINGLE ROLL CRUSHERS

25 Years of service TO THE CEMENT INDUSTRY 1926-1951

Central control board, Fuller-Kinyon System.

When Fuller Company was organized in 1926, the entire personnel numbered only twenty-two. In the ensuing quarter century, constant research and engineering development have enabled Fuller to grow and expand, until the company now operates two manufacturing plants and has a personnel of approximately 800.

Originally, Fuller offered the Portland Cement Industry only the Fuller-Kinyon Conveying System. This conveying system has had the widest possible acceptance by the cement industry—today more than 96 percent of the cement plants in the country use it for conveying finished cement, and many for conveying cement raw materials, pulverized coal, and flue dust.

But Fuller—through close contact with the cement industry—has kept abreast of its progress. As new and improved processes were developed for the manufacture of Portland cement, Fuller designed and built new and improved equipment for its handling. Today, Fuller equipment and systems are helping in the production of better products at lower costs—are meeting and even anticipating the needs of the Portland cement industry, thanks in no small measure to the close cooperation and helpfulness of members of the cement industry.

Manheim, Pa. Plant.

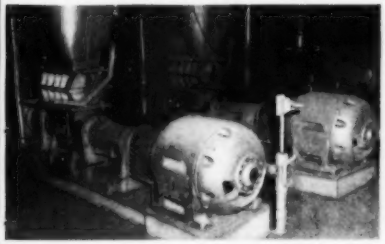
Catasauqua, Pa. Plant.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT

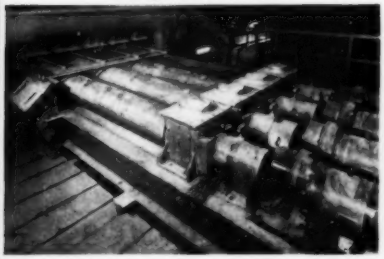
G-68T

Fuller-Kinyon Pumps, conveying finished cement.



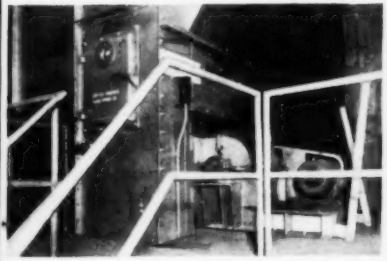
Two Fuller Inclined-Grate Coolers, capacity each 5000 bbl./24 hrs.

Fuller Dry Pulverized-Material Coolers, cooling finished cement.

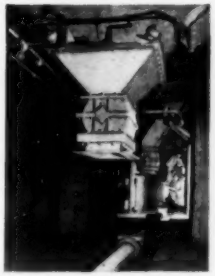


F-H Airslide Conveyor, transporting cement raw materials from elevator to storage bin.

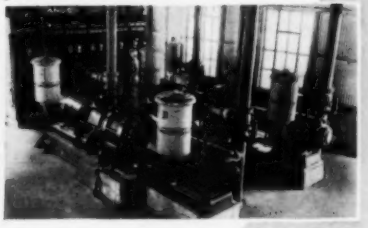
Fuller Clinker Breaker.



Rotary Discharge Valves underneath cement storage silos.



Two Fuller Rotary Duplex Single-stage Compressors, capacity each 2040 c.f.m., 40-lb. pressure.



FULLER COMPANY, Catasauqua, Pa. • 120 S. LaSalle St., Chicago 3 • 420 Chancery Bldg., San Francisco 4

Another ALLIS-CHALMERS Rotary Kiln Going Into Service

TO HELP MEET today's huge demands for cement, this 375-ft wet process kiln was recently put into operation by an Eastern cement manufacturer.

Cement plant operators in the United States and throughout the world have found Allis-Chalmers rotary kilns a *profitable* investment . . . in terms of low production costs, long, dependable service life and low maintenance. Here are some of the reasons why:

- Allis-Chalmers has unexcelled engineering experience and shop facilities for manufacturing kilns and maintenance parts . . . offers special facilities for *expediting* replacement parts from A-C shops directly to the customer with a minimum of delay.
- Allis-Chalmers has led the way in the development of rotary kilns to their present high production efficiency .. has engineered such major improvements as centralized kiln control, the heat recuperating chain system, air-cooled feed and discharge ends, improved kiln feeders.
- Allis-Chalmers has had over a half century of experience in engineering and building equipment for *hundreds* of cement plants. A-C can cooperate in the design of a complete plant from the ground up—and furnish all equipment too. When you specify Allis-Chalmers you get *undivided responsibility* for *all* equipment!

The Allis-Chalmers representative in your area can give you the complete facts about Allis-Chalmers kilns. Call him or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 07B6368A.

A-3443

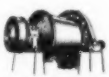
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Motors

Controls


Grinding Mills

Vibrating Screens

Gyratory Crushers

Jaw Crushers

For lower grinding costs, higher grinding efficiency...

U·S·S LORAIN ROLLED PLATE LININGS are designed for quick, easy handling . . . save hours of installation labor, keep mill down-time to a minimum. And the rugged strength of the rolled steel from which Lorain Linings are made enables you to use a plate of reduced thickness . . . thereby increasing usable diameter of your mill, boosting output.

The use of U·S·S Lorain Linings means economy in maintenance of both shell and lining. Tight joints between liner plates and lift bars eliminate shell wash and allied troubles. Liner plates may be worn paper thin without breakage. Plates are made interchangeable—and severe localized wear at feed or discharge ends may be balanced by shifting plates. Through such features you get *all* the life out of the lining.

There's a length, diameter and thickness of Lorain Plate to fit any type of mill. Available through leading mill manufacturers whose names will be furnished upon request.

U·S·S GRINDING BALLS help to make better, more economical grinding doubly sure. For they're forged from special analysis steel and are accurately heat-treated to take the punishment of the longest, heaviest runs. Available in sizes from $\frac{3}{4}$" to 5" in diameter. For complete information about long-lasting U·S·S Grinding Balls send for our new booklet. No obligation, of course. Just return the convenient coupon below.

United States Steel Company
Room 4258
525 William Penn Place
Pittsburgh 30, Pa.

Without obligation on my part, please send me your FREE booklet on U·S·S Grinding Balls.

Name.....

Company.....

Address.....

City..... State.....

UNITED STATES STEEL COMPANY, PITTSBURGH · COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

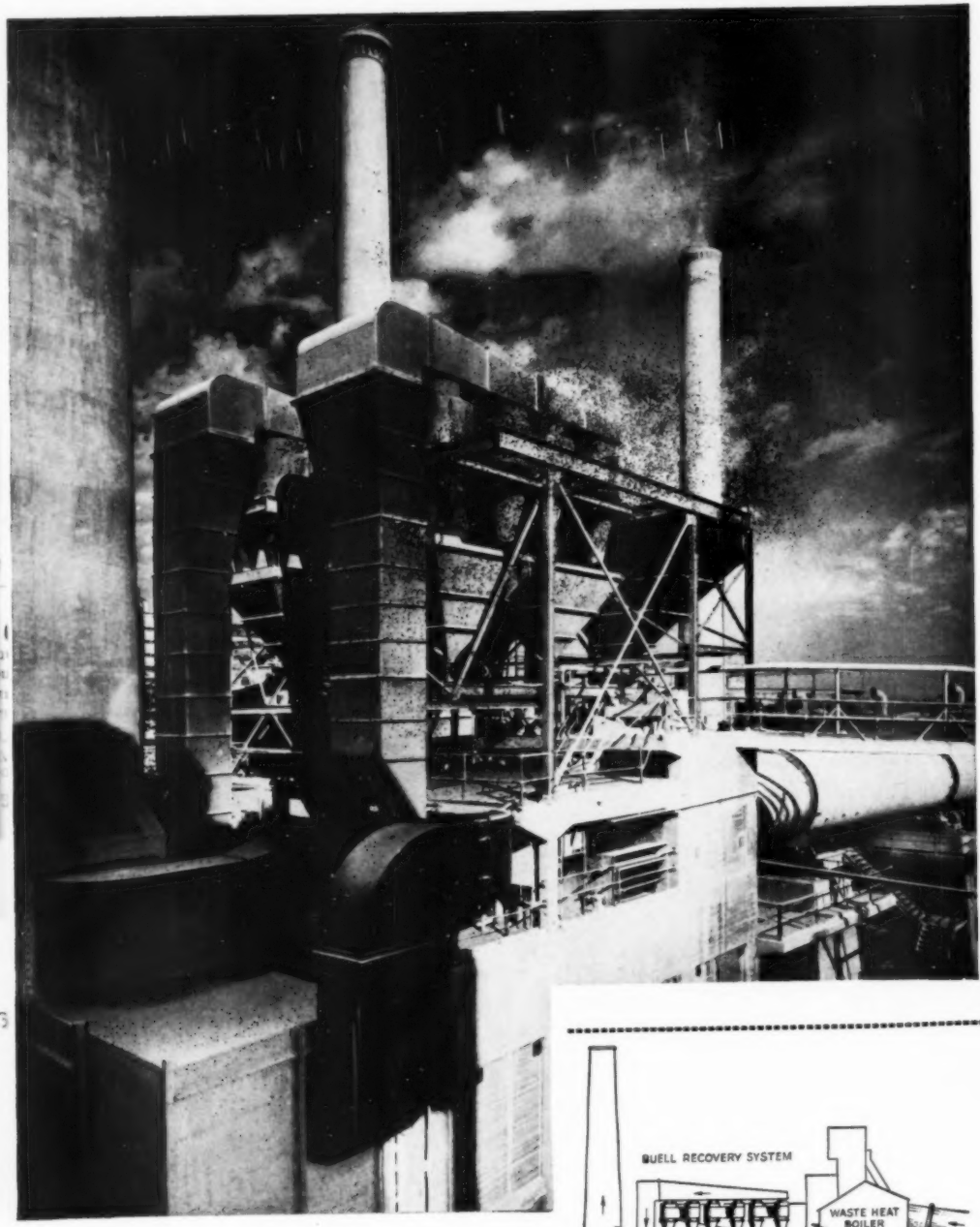
USS

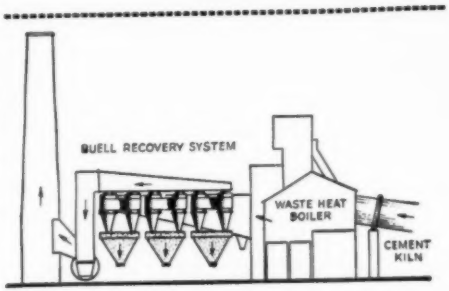
U·S·S LORAIN ROLLED PLATE LININGS and U·S·S GRINDING BALLS

1-907

UNITED STATES STEEL

In Cement and Lime Kiln





Dust Recovery...

BUELL TOPS THEM ALL

Buell Recovers More Dust

High Cyclone efficiency . . . with the exclusive van Tongeren 'Shave-Off'. . . fits hand in glove with industry needs. Loss in the gas outlet consists mainly of alkalis, permitting the cement dust to be returned to kilns without any interruption to manufacturing operations.

Buell Cyclones Don't Plug

Large diameter cyclones and outlets just won't plug. All cyclones operate at same high efficiency . . . even gas distribution prevents overloading some cyclones while others loaf.

Wear Resistant, No Maintenance

Heavy steel plate construction and large diameter cyclones cut the abrasive effect of rock dust to a minimum. Cost of shutdowns, clogging and repairs at a practical zero.

BUELL 'SF' ELECTRIC PRECIPITATOR

for the collection and recovery of fine dusts, fumes and vapors features design advancements resulting in superior performance. Thoroughly proven by many installations it is available in sizes and types to meet specific requirements.

We will be glad to consult with you on your dust recovery problem. Buell Engineering Company, 70 Pine Street, Suite 5055, New York 5, N. Y.

buell

Engineered Efficiency in DUST RECOVERY

Now! "Self-Serve" Operation - Bailey Meter

Your "Self-Serve" Bailey controlled rotary kiln literally thinks for itself and reacts quickly and correctly to any changes in operating conditions. You get:

1. **Economical Operation**—*Gives maximum production from every unit of fuel you burn* because Bailey Combustion Control closely guards Fuel-Air Ratio, Hood Draft, Fuel Feed, Clinker Cooling and Temperature of Air for Combustion.

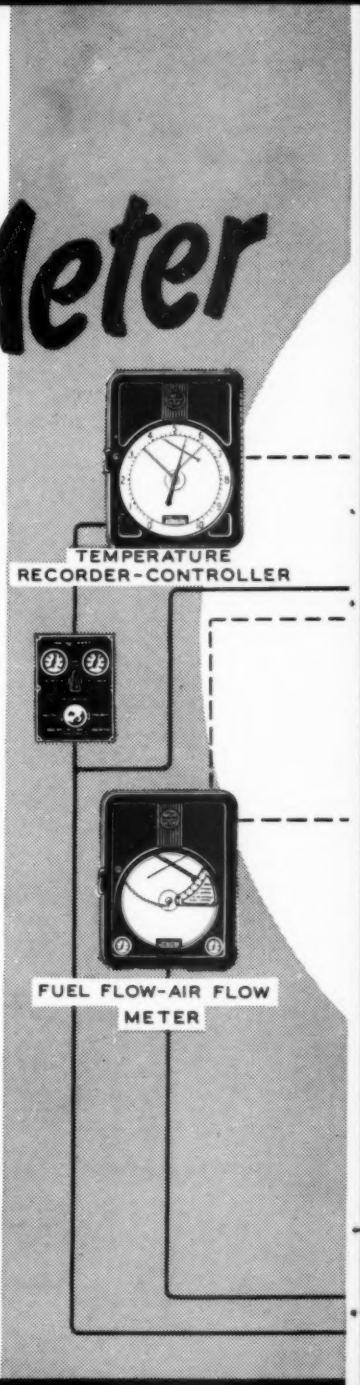
2. **Uniform High Quality of Product**—Accurate measurement and control of Kiln Speed, Burning Zone Temperature, Combustibles Content and Oxygen Content . . . *for a high grade product, consistently.*

3. **Minimum Maintenance**—Uniform excess air conditions and constant temperatures *prolong the life of your kiln.* Costly refractory repairs and wear and tear on auxiliary equipment are reduced to a minimum.

The accompanying diagram shows one way in which Bailey instruments and controls can give you a "Self-Serve" Kiln. Other arrangements to suit the requirements of any rotary kiln are available.

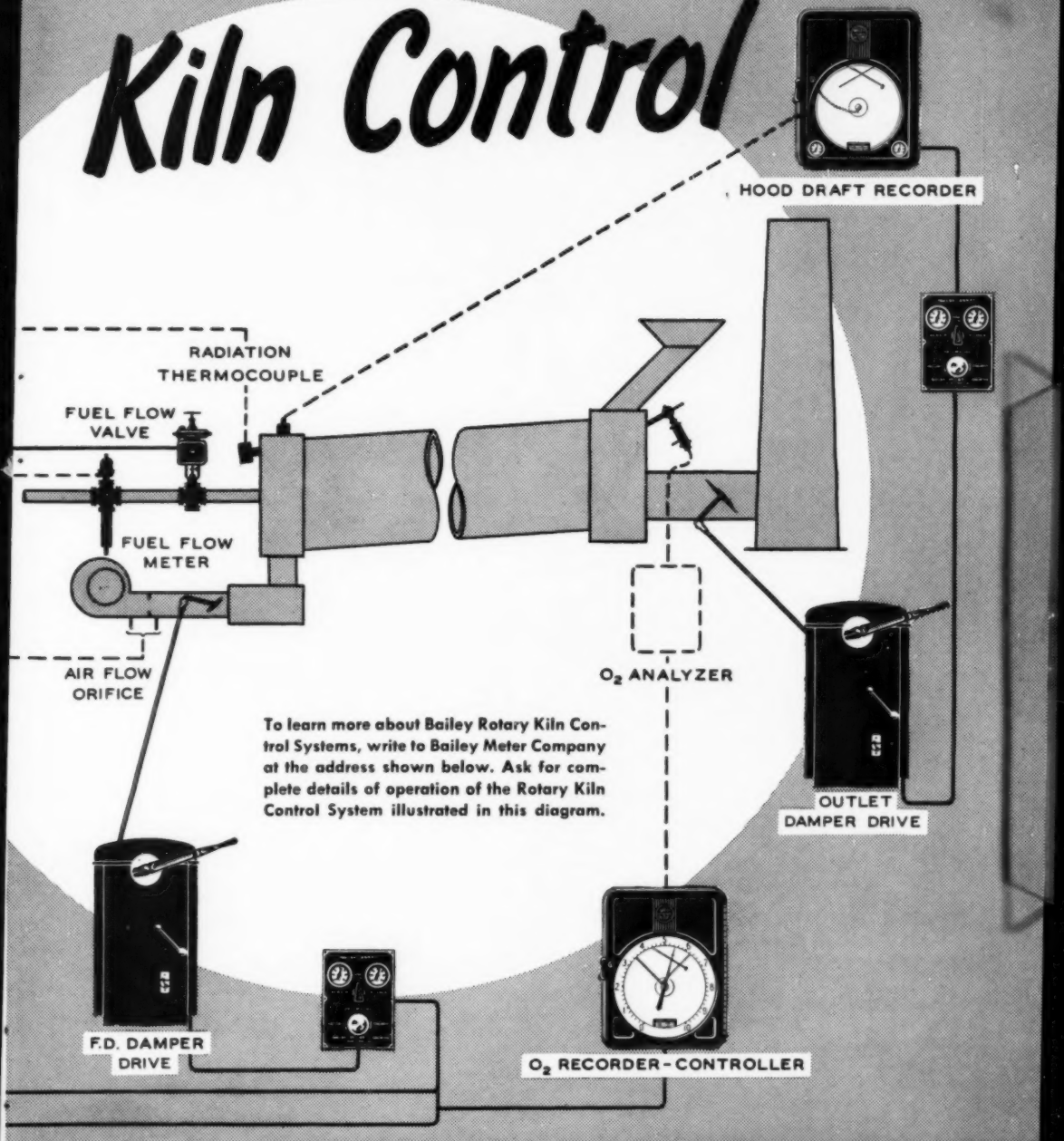
Bailey Meter Company maintains a staff of engineers who are experts in the control of rotary kilns. Let one of these men help plan a control system to give you a "Self-Serve" rotary kiln.

P-23



Bailey Meter Company

Kiln Control

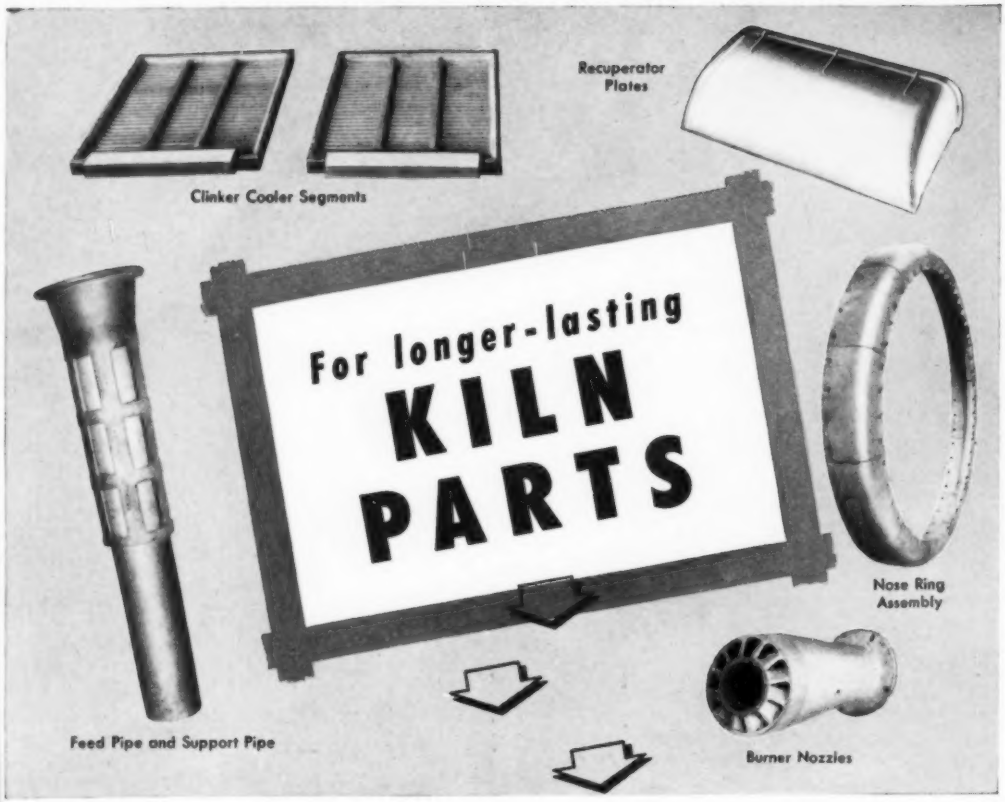


To learn more about Bailey Rotary Kiln Control Systems, write to Bailey Meter Company at the address shown below. Ask for complete details of operation of the Rotary Kiln Control System illustrated in this diagram.

Meters and Control Systems for Process Plants

1051 IVANHOE ROAD • CLEVELAND 10, OHIO

Bailey Meter Company Limited · Montreal



Other Thermalloy Uses in the Cement Industry

- Chain, conveyor, clinker, drag
- Cooler lifters, spouts, grating, side plates
- Dampers
- Kiln end rings, feed chutes, hangers
- Kiln shell segments
- Slurry feed pipes

Investigate THERMALLOY*

Thermalloy has proved in hundreds of kiln installations that it can take heavy loads and rough usage... resist corrosive gases, excessive heat (up to 2100°F) and abrasives.

Thermalloy is not just one alloy. It is a *group* of alloys, each developed to meet a specific heat and abrasion problem.

An Electro-Alloys engineer can show you how Thermalloy kiln parts can give you *lower operating costs per hour* . . . assist you in selecting the design best suited to your needs. Call your nearest Electro-Alloys office, or write Electro-Alloys Division, 2134 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO

CAN YOU AFFORD A FEEDER WITHOUT THESE 6 FEATURES?

1. **SPROCKET TEETH** . . . replaceable without removing sprockets.
2. **SELF-CLEANING LINKS** . . . they won't jump.
3. **LINKS CAST INTEGRAL WITH PANS** . . . no bolts to lose.
4. **ALL WEARING PARTS** . . . pans, links, sprockets, rollers . . . of cast super-manganese steel.
5. **PANS INTERLOCKED** at four points . . . can't sag.
6. **MOUNTED** on heavy structural steel bed . . . braced and reinforced.

Lone Star Cement Installs Another Pioneer-Oro Feeder

What better recommendation for a feeder than repeat orders? Last year Lone Star Cement Corporation, one of the world's largest cement producers, installed another PIONEER-ORO Feeder. This huge feeder is 45 feet long with a clear width of 5 feet.

Money can't buy a stronger, tougher feeder! All wearing parts . . . pans, links, sprockets and rollers . . . are of cast manganese steel. The patented pans in this Lone Star installation are ¾" thick, each weighing 800 pounds. Four supporting points on each pan prevent sagging, even without rollers. PIONEER-ORO Feeders are made in widths up to six feet, and lengths to meet your requirements.

In addition to a broad line of PIONEER-ORO Feeders, Pioneer builds Traveling Grizzly, Forged Steel Apron and Heavy Duty Mechanical Feeders—in many sizes. Mail the coupon below for further feeder information.

BUY BOTH!
Higher Output, Lower Upkeep!

Pioneer
Continuflo **EQUIPMENT**

MAIL COUPON TODAY!

PIONEER ENGINEERING WORKS
1515 Central Avenue • Minneapolis 13, Minnesota

● Please send information on the equipment checked.

- ☐ PIONEER-ORO FEEDERS
- ☐ APRON FEEDERS
- ☐ TRAVELING GRIZZLY FEEDERS
- ☐ CONTINUFLO CONVEYORS
- ☐ JAW CRUSHERS
- ☐ ROLL CRUSHERS
- ☐ VIBRATING SCREENS
- ☐ WASHING PLANTS

Name_____
Company_____
Address_____
City_____ Zone____ State_____

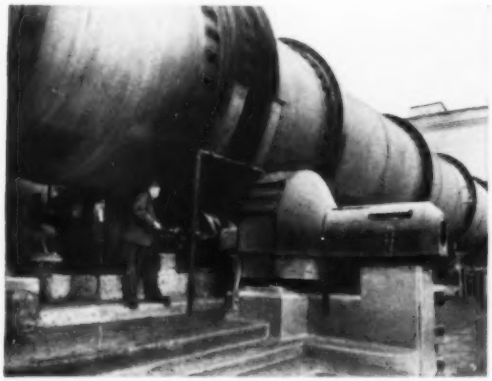
CONTROL BURNING

Modernize electrically with adjustable-speed drives to more accurately co-ordinate kiln rotation and rate of kiln feed for higher quality and greater cement output!

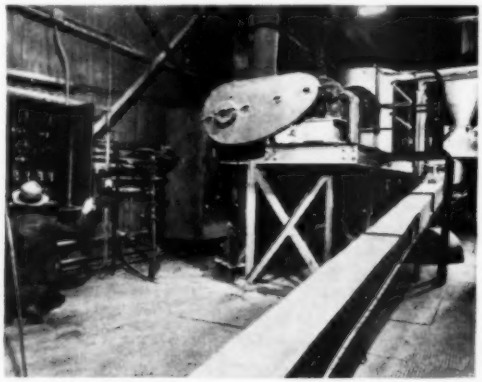
It's a "must" for cement mills today. For maximum cement production and uniformity, all phases of the burning process—kiln rotation and kiln feed—should be closely synchronized and fuel feed precisely controlled.

The right drive to fit your requirements. That's why many cement mills are installing modern General Electric adjustable-speed drives that provide accurate, easily-regulated speed control and close speed co-ordination of kiln feeder and kiln. Available in many types, they include the well-known d-c adjustable-voltage system.

Save time, effort, worry! Moreover, to simplify and hasten modernization of *your* mill, General Electric can co-ordinate the selection, manufacture, and delivery of all the G-E equipment, saving you and your staff time, effort and worry—and assuring you a reliable, integrated electrical system. And whether you order individual motors and control, or all the electric equipment needed for a completely modernized department, you get the help of an experienced G-E representative. Call your nearest G-E office today! *General Electric Co., Schenectady 5, N. Y.*



2 Here is a close-up of one of the G-E kiln motors coupled to a transmitter (both under weather covers). Selsyn transmitter—rated 10 hp, 440 volts, speed range 750/375—actuates selsyn receiver in kiln feed house to co-ordinate kiln feed and kiln rotation.



3 In the kiln feed house, feeder units consist of three 31-tons-per-hour feeder screws. The selsyn-receiver controller, similar in construction and rating to the selsyn transmitter, regulates the speed of the kiln feeder screws to correspond to that of the kiln.

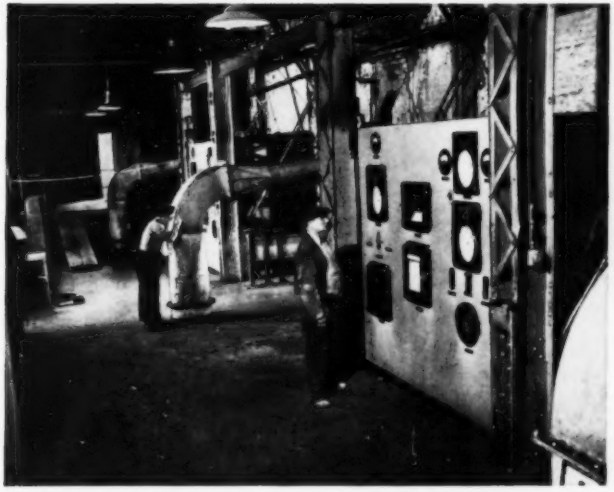
You can put your confidence in—

GENERAL ELECTRIC

658-6

MORE ACCURATELY

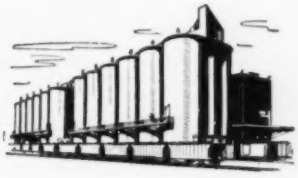
1 **In this large Eastern cement plant** using the dry process, three kilns, 233 feet long, 12 feet in diameter, are driven by G-E adjustable varying speed motors rated 125 hp, 550 volts, 25 cycles, 750/375 rpm, equipped with selsyn transmitters electrically connected to feeder units.

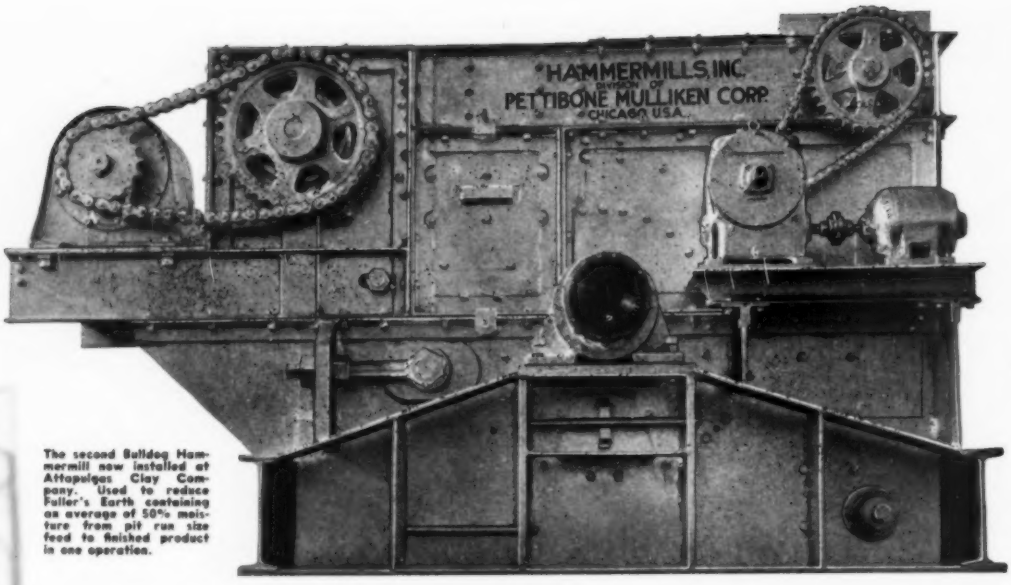


4 **Control of the entire burning process** is centralized on the burner's deck shown here. A panel for each of the three kilns incorporates all the indicating and recording instruments to enable the burner to accurately control the entire clinker-burning process.

Where can *you* profit by electrical modernization?

Kiln operation is only one of several cement-plant processes that offer opportunities today for increased efficiency through electrical modernization. Whatever department *you're* going to modernize—from quarry to packhouse—your best bet for a smooth-working installation is to talk it over with your G-E representative. Call him in at an early stage in your planning!

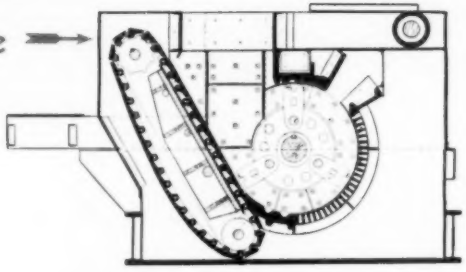




The second Bulldog Hammermill now installed at Attapulgas Clay Company. Used to reduce Fuller's Earth containing an average of 50% moisture from pit run size feed to finished product in one operation.

BULLDOG HAMMERMILL

with Moving Breaker Plate



For wet, sticky material reduction . . . for those tough, heavy-duty crushing jobs.

Illustrated above is the last word in Moving Breaker Plate Hammermill design. It is built by an engineering organization whose experience far surpasses any organization that might furnish Moving Breaker Plate crushing equipment.

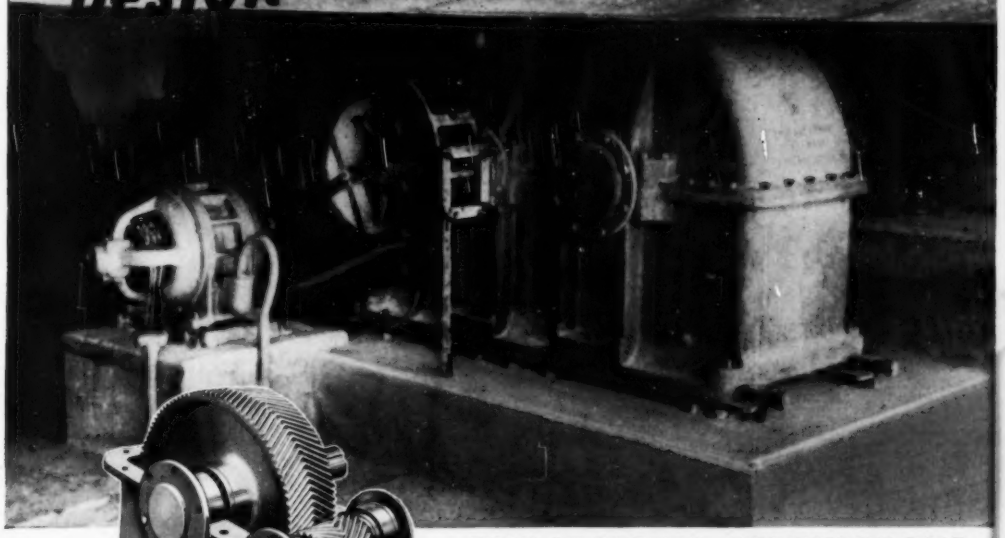
Design Improvements have increased reduction efficiencies and lowered H.P. requirements. You can see this equipment in operation at any time. Also Hammermills will gladly survey your reduction requirements and recommend the proper equipment without cost or obligation. Just write or call.

Bulldog Hammermills are built in capacities up to 1000 tons per hour for every purpose: for primary, secondary, fine reduction of materials such as limestone, shale, Fuller's Earth, phosphate muck, phosphate mud balls, iron ore, oyster and clam shells, any reducible material.

HAMMERMILLS, INC. *division of* **PETTIBONE MULLIKEN CORP.**

4757 W. Division St. Chicago 51, Illinois Phone SPaulding 2-9300

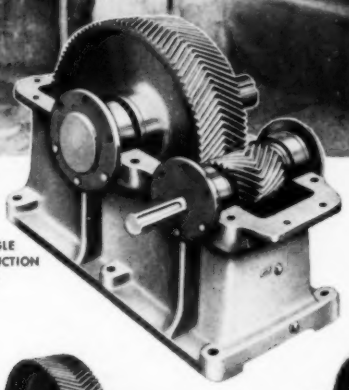
BALANCED DESIGN MEANS LONGER, TROUBLE FREE SERVICE



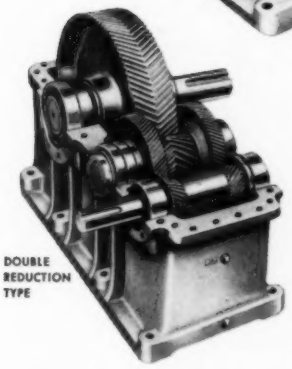
PHILADELPHIA HERRINGBONE SPEED REDUCERS

Because of symmetry of design of these units, the bearings share the load equally. This well planned construction permits the use of 2 standard bearings on each shaft, rather than the usual offset design. The balanced arrangement of the gears further reduces shaft stresses and eliminates end thrusts.

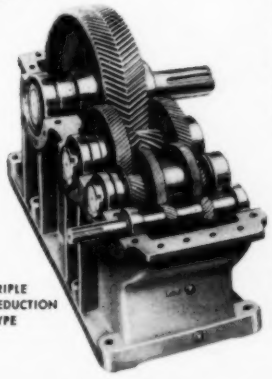
Philadelphia Herringbone Reducers are built in single, double and triple reductions, depending upon the number of gear trains used. Each type covers a wide range of sizes and ratios . . . as standard ratios are from 1.75 to 1 up to 320 to 1, practically any equipment can be provided with the correct operating speeds. These units are also ideal for speed increasing. Efficiencies are obtained up to 98%.



SINGLE REDUCTION TYPE



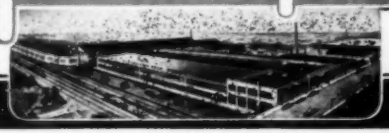
DOUBLE REDUCTION TYPE



TRIPLE REDUCTION TYPE

For complete details about Philadelphia Herringbone Units, send for catalog H-49 . . . use your business letterhead, please.

Philadelphia Gear Works, INC.



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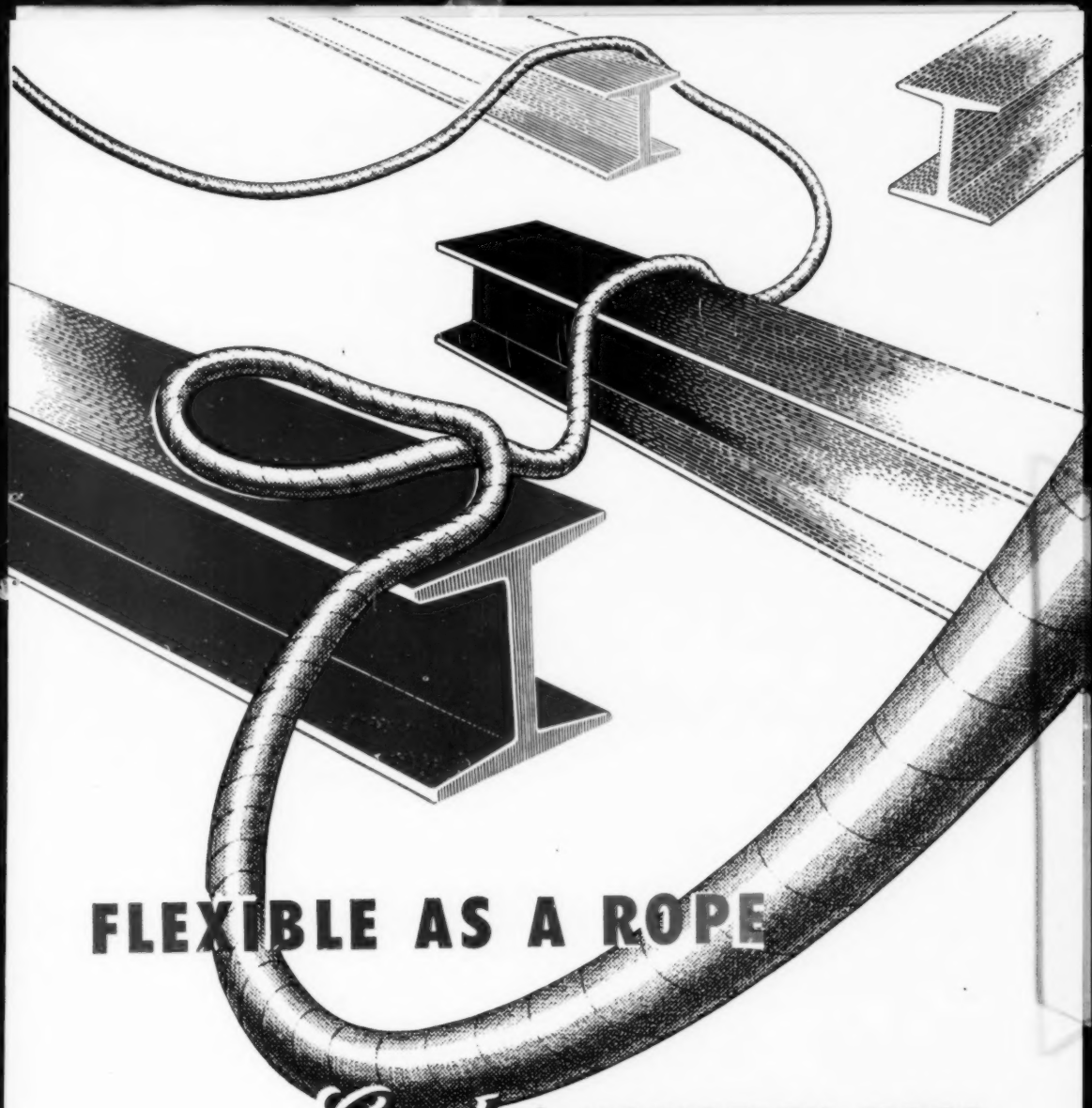

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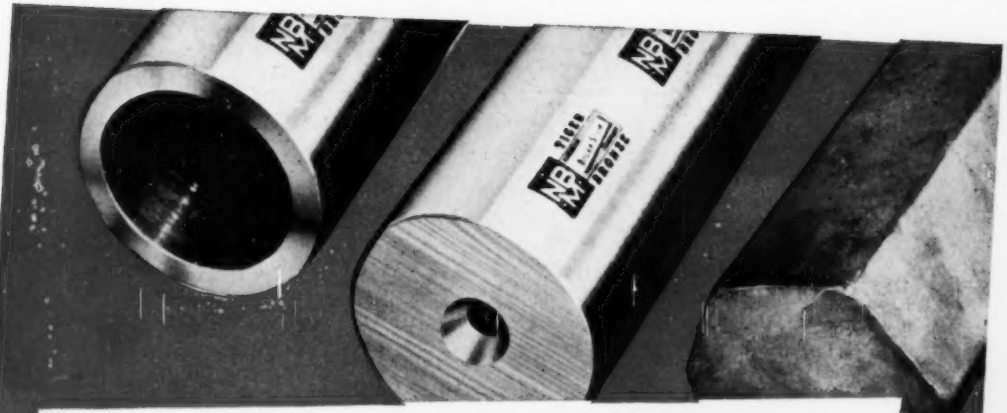

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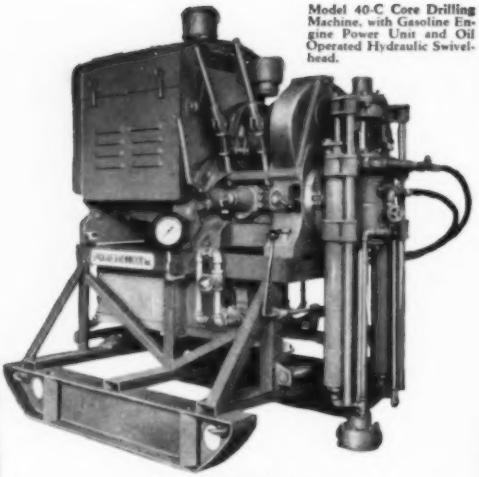

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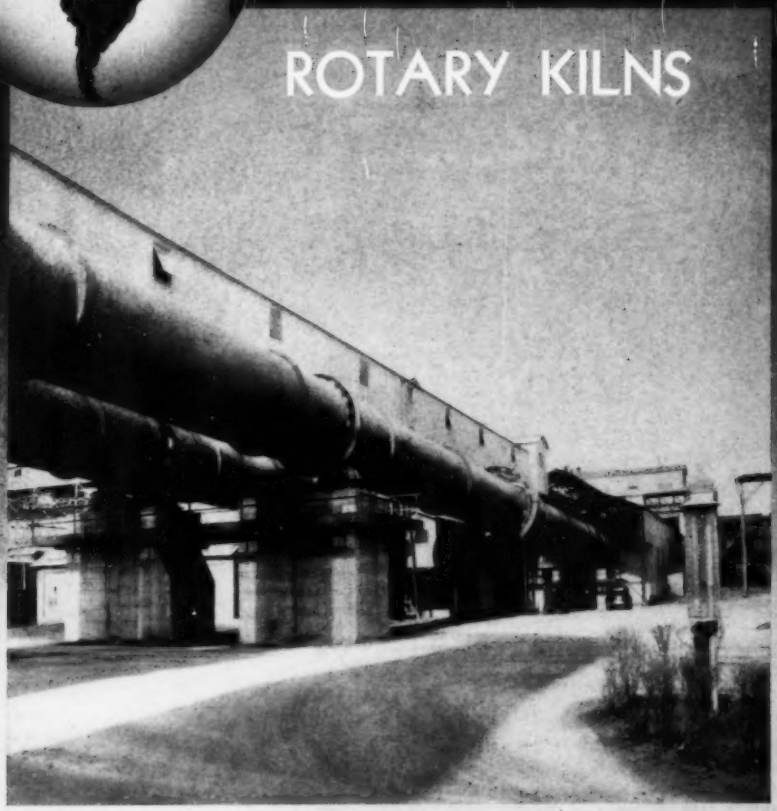

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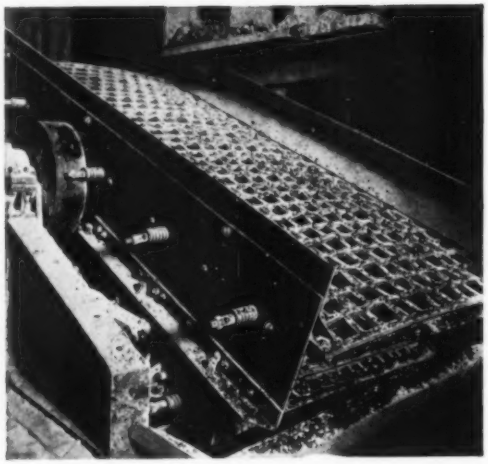

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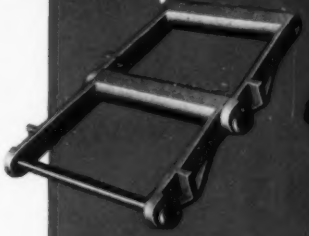

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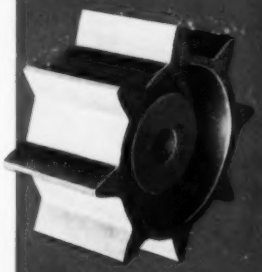

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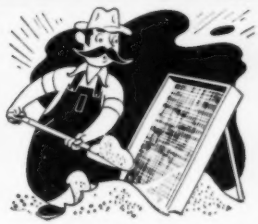
S-9

Screenings



by William M. Avery

THE following quotations are excerpts from an article entitled "Cement for Socialist Construction" published in a recent issue of the *Romanian News,* an English-language paper which obviously follows the party line with scarcely a waver. Like all Soviet propaganda, this job is on the windy side, but we are passing on enough of it, we hope, to give our capitalistic friends in the American cement industry some notion of how cement production quotas are met behind the Iron Curtain. The whole thing lends a certain credibility to the recent Soviet claim to having invented portland cement. Our hunch is that they invented it not longer ago than July, 1950.

"Our factory cannot produce more. No matter what we do, no matter how hard we try, we cannot achieve the whole plan." That is what the former director of the cement factory "Temelia" of the City of Stalin often said.

And indeed, the production of the factory continued to be slightly below the plan. Many people had begun to believe sincerely that it had arrived at the limit of its productive capacity.

"The capitalists never produced so much cement," they said by way of consolation.

One day a new director was put in charge of the factory: Matei Pincovici, a worker, determined and firm. When he was sent there, he was told, "We will need more cement than the amount produced to date, for the achievement of the Five-Year Plan."

The new director studied the factory, the methods of work. . .

"It is a good thing that we have surpassed the maximum production of the capitalists," he said one day, at a meeting. "But that shouldn't cause us to fold our arms. We shouldn't compare our production figures with the times when the capitalists ruled. The capitalists, who never built a single apartment with bathrooms for the workers, didn't need too much cement."

"The director is right!" said the burner Aurel Moldovan.

"He is right!" echoed the chief engineer.

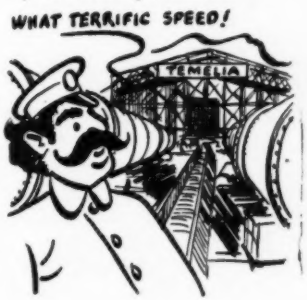
Some days later, the workers and technicians of the factory started socialist competitions by trades, in order to produce still more cement, in the quarries, the grinding mills and the kilns.

"Our furnaces work day and night," said the burner Aurel Moldovan. "They are so full that nothing more can be added, not even a grain of sand. And the month has only 30 or 31 days. Nobody can add one to it. What can be done then, how is it possible to increase production?"

"Well, let's see. Because of repairs, our month often has less: scarcely 25 or 26 days!" replied the foreman Mihai Popovici.

From that was born the idea, enthusiastically taken up by the whole factory: "Reduce the days of repair! And these days we will add to our work month!" The director, the chief engineer, and the technicians established a schedule of repairs. They calculated with precision the moment when it was necessary to make repairs and how long it would take. Not a day lost!

And so the work month became longer. The kilns remained inoperative for shorter periods of time and turned out more. "And nevertheless that is not good enough!" thought the burner Aurel Moldovan. "The furnaces move too slowly! One turn per minute!"



Little by little Moldovan succeeded. A non-specialist would not have noticed that the immense kiln turned its huge body faster and faster. It was only a quarter of a turn at most and sometimes even less than that. But Moldovan knows his furnace well. And that quarter of a turn a minute seems to him to give his kiln a terrific speed.

The "Temelia" factory succeeded in fulfilling its program. In September it surpassed it by 1 per cent, in October by 7 percent, and since then the program has always been surpassed.

"What then is the limit?" asked the director in a production conference which took place recently. "We have begun the Five-Year Plan. The tasks are much larger than before. We must deliver cement for our peaceful constructions designed to strengthen our Fatherland, to negate the plans of the warmakers. Is there any obstacle whatever, any limit whatever which can halt our progress? All the workers of the factory have shown that there is no obstacle, no difficulty, that free men who are working for peace, for their own happy lives, cannot conquer."

That laconic statement to the effect that "one day a new director was put in charge of the factory" leaves us vaguely uneasy about the possible fate of the former director. The literal-minded Soviets probably "fired" him—straight into the rotary kiln.

Duck on Rock

AS a gesture of thanks for the reception accorded to President Vincent Auriol on his recent visit to this country, the French have given the name Truman Rock to a sizable chunk of granite which projects from Mount Saleve near Geneva. We hope that Harry will be able to control his reflexes sufficiently to keep from ducking at the mere mention of the word rock.

Report on Current Labor Developments

Salary Stabilization

THE "freeze" of January 25, 1951, affected not only wages but also salaries. Since then both the old Wage Stabilization Board and the recently created new Wage Stabilization Board have promulgated regulations and interpretations designed to permit flexibility. All of those regulations were designed primarily to meet the problems of wage earners. They dealt primarily with the situation where the rate is determined for groups of employees. These regulations were singularly inappropriate when applied to salaries where the rate is generally determined singly and frequently with special regard for the incumbent.

This problem also existed in connection with the stabilization program during World War II. The solution then was to give jurisdiction over wages to the tri-partite War Labor Board, while jurisdiction over salaries was given to a special Salary Stabilization Unit in the Bureau of Internal Revenue. This arrangement came in for some serious criticism primarily because the administration of the two parts of the program was so widely separated that inconsistencies developed. Trade unions particularly complained that far less stringent rules were applied to applications for salary increases than were applied to wage applications.

On the other hand, having applications for salary increases come before the Wage Stabilization Board also has many serious disadvantages. Employers were unwilling to reveal salary data, particularly the salaries of their executives, to the industry members of the Board, who might often be their competitors; and they were even more unwilling to reveal such information to labor union representatives who sat on that Board.

In an attempt to overcome all of these difficulties, Economic Stabilization Administrator Eric Johnston has set up a Salary Stabilization Board composed entirely of representatives of the public. They will rule on the pay of all employees employed in *bona fide* executive, administrative, professional, and outside salesmen capacities, as defined in the Fair Labor Standards Act, except where such employees are represented by labor unions.

To make sure that the application of wage and salary stabilization is as nearly consistent as possible, the Economic Stabilization Administrator issued the following instruction, "In the exercise of its responsibilities and functions, the Salary Stabilization Board shall conform to the regulations, policies, orders and decisions of the Wage Stabilization Board to the fullest practicable extent, to provide a uniform and coordinated program for the stabilization of all wages, salaries, and other compensation of employees under the jurisdiction of both Boards." In addition, the chairman of the Wage Stabilization Board was designated to serve as an ex-officio non-voting member of the Salary Stabilization Board and advisor to that Board.

Henceforth all applications for approval of adjustments in the salaries of executive, administrative, or professional employees as outside salesmen should be sent directly to the Salary Stabilization Board, Economic Stabilization Administration, Washington 25, D. C.

Wage Stabilization in the Construction Industry

The establishment of the Salary Stabilization Board served as a precedent for the establishment of other specialized boards to deal with specialized problems. Thus the Wage Stabilization Board recently set up a Construction Industry Stabilization Commission.

This is a 12-member commission, four of whom, including the chairman and the vice-chairman, will be representatives of the public, four will be representatives of labor in the building and construction industry, and four will be representatives of management in that industry, including two representatives of general contractors and two representatives of subcontractors.

The Construction Industry Stabilization Commission has been authorized to administer the wage stabilization program for the building and construction industry. Its jurisdiction extends to all wages and salaries paid its mechanics and laborers employed directly upon the site of the work. It does not cover employees whose work is non-manual such as technical, executive, administrative, and clerical employees. The term "building and construction industry" includes, for this purpose, constructing, altering, remodeling, and painting and decorating installations such as buildings, bridges, highways, and the like.

It was necessary to set up this separate commission because many of the regulations being issued by the Wage Stabilization Board were primarily designed to deal with industrial employment situations and were unsuited to the special situations found in the building and construction industry. Also, wage rates in this industry were already somewhat controlled under the Davis-Bacon Act, and it was necessary to co-ordinate the two programs.

In announcing the creation of this commission the Wage Stabilization Board pointed out that it had been requested by nine national contractors' associations and by 19 international unions belonging to the American Federation of Labor Building and Construction Trades Department.

Employers in the pit and quarry industries will no doubt be affected by the actions of this commission, even though they are not under its jurisdiction. Their workers are frequently quite similar to building and construction industry workers, or in the course of their employment they frequently come in contact with building and construction industry workers. Also, pit and quarry employers are frequently required to bargain with building and construction trade unions. As a result, the influence of wage adjustments in the building trades is often strongly felt in the pit and quarry industries.

Tandem Wage Increases

Many employers have found themselves in a difficult situation because the wage freeze has prevented them from following an established past practice of giving wage increases after some other related group has given a wage increase. Some employers followed the practice of giving their office employees increases related to increases given their production workers. Other employers may have followed certain leading companies or certain related industries. Perhaps some pit and quarry truck drivers were given increases related to the increases given similar workers in the building and construction industry.

To allow the continuation of such past practices the Wage Stabilization Board has recognized the existence of "tandem relationships," which it defines as "a well established and maintained practice

(*Continued on page* 172)

By S. HERBERT UNTERBERGER
Director of Research
Labor Relations Information Bureau
Washington, D. C.

Effect of Government Control Is Theme Of 16th Annual N.I.S.A. Meeting

another ON THE SPOT report

By WALTER E. TRAUFFER

THE 16th Annual Meeting of the National Industrial Sand Association was held May 16, 17, and 18, 1951, at the Homestead, Hot Spring, Va. It was, as usual, well attended, and the program included many outstanding authorities speaking on a wide variety of subjects of importance to the industry. As usual, also, representatives of the industry spoke on industry problems, and members of the Washington staff made their annual reports and analyses. The keynote of the meeting was government control and its effect on operations. The weather could have been better, but it did not interfere with golf and other recreation and a picnic in the mountains one evening.

It was announced that the annual fall meeting of N. I. S. A. will be held at The Greenbrier, White Sulphur Springs, W. Va., October 17, 18 and 19, 1951. Arrangements have also been completed with The Homestead for five consecutive annual meetings through 1956. The board of directors was reported to feel favorably inclined toward holding the 1952 fall meeting in Bermuda.

Officers and Directors All officers were re-elected for a second year. They are as follows: Sterling N. Farmer, president (Sand Products Corp.); C. M. Hardy, vice-president (Hardy Sand Co.); Clarence R. Wolf, treasurer (National Pulverizing Co.). Members of the board of directors carrying over for another year are Russell G. Cronenweth (Great Lakes Foundry Sand Co.); Lyle T. Manley (Manley Sand Co.); and Jesse T. Morie (Jesse T. Morie & Sons, Inc.). New directors elected at this meeting are Earl T. Andrews (Pennsylvania Glass Sand Corp.); Emery M. Durstine (Keener Sand & Clay Co.); and P. W. Palmer (Browntown Silica Co.). Ex-officio members of the board are J. M. Strouss (Deckers Creek Sand Co.); A. Y. Gregory (Whitehead Brothers Co.); and George A. Thornton (Ottawa Silica Co.).

Industrial Health The annual report of the association counsel, Theodore C. Waters, on current developments in matters of industrial health was one of the features of the program. This subject has always been one of utmost importance to the industry and is becoming more important every year. Now, said Mr. Waters, the industry is beginning to reap some of the benefits resulting from the time and money it has spent on this problem. These benefits include improved employer-employee relations, direct savings in insurance and operating costs, etc., and make it obvious that it is good business to continue these efforts unabated.

On the subject of legislative developments in workmen's compensation during the calendar year 1951 Mr. Waters stated that it has been an active year among state legisla-

Mr. and Mrs. Charles Gorsuch and Mr. and Mrs. A. F. Harrison (Ayers Mineral Co.).

Below: Mrs. J. H. Whitehead (Whitehead Bros. Co.); Mrs. A. Warsaw (Wedron Silica Co.); Mr. and Mrs. T. E. Rust (Clayton Silica Co.).

Mr. and Mrs. Russell Cronenweth (Great Lakes Foundry Sand Co.) and their daughters, Ann and Joyce.

Mr. and Mrs. John F. Putnam and Mr. and Mrs. Frank T. Rogers (National Silica Co.).

tures, all except four of which have been in session; and most of these have considered or are considering such bills. Up to the first of the year 41 states had enacted occupational disease compensation statutes. Oklahoma is considering several bills which, he said, follow more or less the usual pattern.

Mr. Waters also told of the unsuccessful efforts made to prevent the repeal of the silicosis and asbestosis compensation statute which became law in New Jersey on January 1, 1945. The repeal of this statute makes the dust diseases compensable without the protective features of (1) limitation of monetary liability; (2) denial of compensation for partial disability; and (3) special limitations relating to the filing of claims. The repeal of this bill was effected through the combined efforts of organized labor, the New Jersey Manufacturers Assn., and the governor.

In Vermont, where the dimensional granite industry is the chief silicosis problem, a scheduled occupational disease statute was enacted which includes compensation. All the diseases made compensable under this law call for benefits only for total disability or death. This law, Mr. Waters believes, is very conservative and should be the subject of satisfactory administration.

Left: Ralph S. Lebold (Michigan Silica Co.) and J. S. Cozey, (Industrial Silica Corp.).

Right: W. B. Gyger (Ottawa Silica Co.) and Marcus S. Wright III (South River Sand Co.).

According to Mr. Waters, final action on such legislation had not yet been completed by the Pennsylvania Legislature, but it seems certain that there will be a substantial increase in compensation benefits. It is unlikely that there will be any changes in the occupational disease provisions.

There are still 21 states, said Mr. Waters, that have special limitations in their statutes applicable to silicosis; 15 deny compensation for partial disability. The insurance rates in the latter states are about one half those in the states where partial disability is compensable. At this time there are 25 states which provide general coverage for occupational diseases, while 18 provide scheduled coverage.

With respect to amendments made by various state legislatures, there has been a material increase in benefits all down the line, with the prospect of further increases in the near future. Mr. Waters stated that this means an inevitable increase in compensation rates and calls for even greater attention by producers to good housekeeping and safety measures to keep these costs from mounting.

Mr. Waters also described the proposed state occupational health and safety bill prepared by the Federal Bureau of Labor in cooperation with state labor law administrators. According to the speaker, this is a draft of suggested language for such bills and the bureau is distributing it to state departments as a guide for legislative action in this field. He criticized the contemplated assignment of the administration of this legislation by the state departments of labor, rather than the state departments of health, but said that there are no reasonable arguments against its objectives.

The state health department of West Virginia, Mr. Waters pointed out, is working on a proposed Code of Industrial Hygiene, following the pattern of the so-called model code of the American Conference of Governmental Hygienists. Several of his suggestions may be incorporated in it. He also discussed the recent activities of the National Council on workmen's compensation insurance rates and said that favorable experience has resulted in a general decline in insurance rates in those applications covering the industry, and that further reductions may be expected if conditions continue to warrant them. Regarding products liability insurance, Mr. Waters said that the industrial sand industry should not be responsible for what happens to an end product. There is some place for such insurance, he conceded, but not at the present exorbitantly high rates.

Railroad Car Supply Arthur H. Gass, chairman of the Car Service Division, Assn. of American Railroads, was unable to be present, but his place was ably filled by Caleb Magee, vice-chairman. After World War II, he said, the railroads tried to build up the supply of cars, but one thing after another interfered. In 1943 there were 750,000 box cars, and that figure has not since been reached. At first the war interfered; then came the steel shortage; and now war needs will probably again force curtailment of car manufacture. There are now 156,000 cars on order, Mr. Magee declared, including 60,000 box cars, 40,000 gondolas, and 40,000 hopper cars; but cuts in steel allocations may delay the expected delivery dates on these. In the first four months of this year 26,000 cars were built, but over 50,000 cars are being retired annually.

From present indications, said Mr. Magee, box cars will remain the No. 1 problem, but gondolas and hopper cars will also be short. It is doubtful, however, if the car shortage will be as serious as it was

George A. Thornton (Ottawa Silica Co.) and C. M. Hardy (Hardy Sand Co.).

late last year, unless cuts in steel allocations are added to the expected demand for cars when the rearmament program gets into full swing. The shipment of grain to India, he pointed out, has not caused much trouble, as this project is using only about as many cars as are being released by companies changing to war production. Coal stocks are also up, and fewer cars will be required for coal, as well as for ore shipments because more boats are being made available to haul the latter.

The industrial sand industry, said Mr. Magee, can help relieve shortages by using more hopper cars in place of gondolas, and by extending the fullest possible cooperation in car conditioning and rapid turnaround. The average turnaround time in April, he said, was 15 days. A cut to 14 days would add 100,000 cars to the supply.

Traffic Matters A session for the discussion of traffic matters was presided over by Emery M. Durstine (Keener Sand & Clay Co.) and William W. Collin Jr. It was thought that the new water-compelled freight rate reduction from Ludington, Mich., might be of interest to the industry in other areas. Some comment was also made on the decision in the bonded sand case in March which resulted in a reduction of all rates on bonded sand shipped in open cars. It is felt, however, that the relief granted is inadequate because it does not give fair rates in comparison with other industrial sands for short hauls. This decision, it was stated, freezes the relationship between the rates for various types of industrial sands as of June 30, 1946.

The box car case received separate treatment, and the association presented data at the hearing. Cer-

C. R. Meyer (Pioneer Silica Products Co.) and Junius M. Strouss (Deckers Creek Sand Co.).

tain users of sand are suing for the refund of excessive rates totaling over $500,000, but producers are not directly interested.

Regarding Ex Parte 175—the general 15 percent flat increase requested by carriers—hearings are to be held at various places, the one on June 11 at Chicago being regarded as the most important. Vincent P. Ahearn, executive secretary, said that shippers are becoming apathetic to rate increases and that resistance to such increases is at least a move for customer good will. Customers of the industrial sand industry expect the association to take part in such proceedings and to see that no unfair rulings are passed. Increased freight rates, said Mr. Ahearn, cause no direct costs to producers but they do lower the competitive position of the industry.

Production Problems The session on operating problems was devoted largely to a discussion of experiences with various types of bagging machines. Arnold Tanzer (New Jersey Pulverizing Co.) told of experiences with new wear-resisting parts for a standard make of bagging machine. Norman H. Crissey (Wedron Silica Co.) described results obtained with a type of bagger new to the industry which fills one valve bag at a time. On unground sand this bagger filled 800 bags in 6 hours with a 3-man crew. It has not yet been tried out on flour, which is more difficult to handle. This packer was felt to be ideal for the small operator who needs no more than 2 spouts. Several other makes and types of packers were discussed, but as yet there has been no operating experience with them.

Stanton Walker, engineering director, gave a brief resume of foundry sand problems. He said that the American Foundrymen's Association sand research division has been less active in the last year but that it is enlarging and revising its sand testing handbook. A new committee has also been appointed to study mold and core sand mixes, and a green sand committee is working on standards and the perfection of tests. Mr. Walker stated that the N. I. S. A. has made some tests which will be of help in writing specifications.

Prices and Machinery Requirements Two of the government speakers scheduled to address this meeting were unable to be present, and Mr. Ahearn summarized developments in their respective fields. Speaking on price stabilization, he said that the industry has been exempted from the general pricing order and that a tailored one will probably be prepared. Each industry has been requested to send in a list of producers representing all types of silica sand, all sizes of operators, etc., and also the names of a few non-producers. According to Mr. Ahearn, Sterling Farmer (Sand Products Corp.) will represent the N. I. S. A. in advising on the formation of an Industry Advisory Committee from these men. This committee will then consult with Mr. Acheson on the form of the order, and it has the right to recommend that industrial sand needs no price control.

Mr. and Mrs. J. J. Bryant (George W. Bryant Core Sands, Inc.).

Mr. and Mrs. William J. Woods Jr. (Pennsylvania Glass Sand Corp.).

Speaking for Harold A. Montag, director of the requirements division, Defense Minerals Administration, who was not present but did write a letter on his subject, Mr. Ahearn said that a new office and staff are being set up to handle CMP problems separately for the Mineral Industries Division, as these problems are different from those of other industries. He said that Form MF100 will require vital information for carrying out DMA plans, and that each company will receive one; if more are needed, they may be obtained. Each plant will have a separate serial number and will require a separate form except where several are operated as a group. Mr. Ahearn declared that the industry will get mining priority for MRO, and every effort will be made to keep all plants going. There will be no expansion, however, except for defense.

Washington Scene A feature of these annual conventions is always Vincent P. Ahearn's review of the Washington scene. As usual, this year he gave much important information on general conditions and trends and on those of direct importance to the industry; he included considerable sound advice on how to adapt operations to the existing and coming conditions. In opening he mentioned the work being done by the President's conference on industrial safety, composed of members of labor, management, the public, etc., including himself. This effort is devoted to the general subject of promotion of safety and the reduction of the number and severity of injuries. This body, Mr. Ahearn pointed out, has no legislative or other powers, but its recommendations bear considerable weight. The pressure for industrial safety is increasing, he said, and the pressure of public opinion is growing rapidly, calling for the best efforts of industry to improve its status in this respect.

Mr. Ahearn then reviewed some of the important developments in Washington, including the new construction control order, which places industrial construction under control for the first time. Any such work requiring more than 25 tons of steel calls for a special license; this applies to new work, repairs, and expansion.

Regarding certification of emergency facilities for accelerated depreciation, Mr. Ahearn said that five-year depreciation is permissible for that part of an operation required for war work, within the limits of 40 and 100 percent. Such certification is hard to get, but he advised producers to apply if they have valid reasons, as such applications are still being approved. He also mentioned the association's industry-wide study of pay and conditions of employment and revealed that confidential summaries of the results have been sent to those who sent in questionnaires. This information, he said, should be invaluable in dealing with unions. The speaker also described the progress being made on percentage depletion.

Mr. Ahearn said that the industrial sand industry is operating under the General Ceiling Price Regulation and pointed out that the industry committee should be permitted to select one of the four quarters of the year for its base period because of the seasonal nature of this business, rather than to use the January 1, 1951, deadline. Regarding pay increases, he said that the 10 percent allowed since January 15, 1950, is a blanket increase; he added if greater increases had been made before the order went into effect, they stand, but the permissible slack has then been used up. He advised producers to be sure to talk over prospective increases with union representatives and, if they cannot afford to increase wages more than 10 percent, to be sure to point this out, as there may be later blanket increases. The 10 percent blanket, he said, applies to straight time average wage rate and can be distributed in any way desired. Promotion increases are not chargeable against the 10 percent, but proof of justification must be made. New jobs since January 26, 1951, must be rated in reasonable relation to similar jobs. Only administrative and executive employees are exempted from this ruling.

Mr. Ahearn pointed out that producers cannot sell or buy in excess of ceiling prices and that the buyer and seller are equally guilty in case of violations. The highest price charged any group or class of buyers is the ceiling price for that group only, and discounts in effect must be retained. If taxes have been absorbed in the selling price to any group, this practice must be continued, even in case of tax increases. If sales were made on a plant price basis, any increase in freight rates may be added.

In actually reviewing the Washington scene, Mr. Ahearn briefly but completely covered the entire international situation and its possible after effects, the probable effects of our defense efforts and expenditures, the shortages of certain vital materials, and the steps being taken to increase imports and our own production of them, etc.

The two principal problems confronting the free world, according to Mr. Ahearn, are the critical shortage of natural resources and the vast numbers of underfed people who are ideal targets for Communist propaganda. Our individual problems are to conserve our natural resources and to develop and protect lines of supply for imports of vital materials. The United Nations, Mr. Ahearn emphasized, must be made to work. It is the world's only hope for freedom. The American people realize that we face a ruthless and powerful enemy and that internal disagreements must not be allowed to weaken our stand or to give the rest of the world that impression.

Labor Developments

(*From page* 168)

whereby the timing, amount, and nature of general adjustments in wages, salaries, and other compensation of employees in a given appropriate unit have been directly related to those of another unit of employees of the same employer or of other employers." If an employer wishes to give a wage increase based on such a tandem relationship, he must first file a petition with the nearest office of the Wage and Hour Division of the U. S. Department of Labor. Such petitions must contain (1) proof of a tandem relationship, including a statement of how adjustments in the appropriate unit involved have been related (in the last five years) to the adjustment in the unit with which the tandem relationship is claimed; (2) an explanation of the circumstances which have disrupted the tandem relationship; and (3) such other supporting data as the petitioner may deem pertinent.

The tandem relationship is not limited to the same industry or labor market area. The adjustments need only be directly related. They are not required to follow any precise chronological order.

Production of cement in Mexico rose to 1,290,000 metric tons in 1950, or 177,000 metric tons more than in 1949. The steady increase of Mexican cement production is shown by the following statistics. 1942—560,000 metric tons; 1947—998,000; 1948—1,080,000.

Principles of Crushing*

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Engineer-in-Charge
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Allis-Chalmers Mfg. Co.

THIS paper includes a discussion of the theory of crushing, energy input required, particle size distribution, crushability tests, particle shapes, general types of crushing equipment, and the characteristics and limitations of the various types of crushers.

THEORY OF CRUSHING

Like all brittle materials, rock breaks when it is deformed beyond its critical strain. The energy input necessary to accomplish this deformation represents the work required to crush or grind, and is usually expressed in kilowatt hours or horsepower hours per ton.

Strain Energy and Surface Energy Theories Nearly all of the energy input required is released as heat when the strain is removed, and appears as a temperature rise in the rock and its surroundings; a small portion is released as noise, and probably a little appears as surface energy, representing a change in the atomic configuration of the new surface formed from its original condition in the interior of the rock. Ordinarily none of the energy released as heat is recovered.

The mechanical efficiency of crushing indicates the degree of utilization of the input energy in breaking rock. The greater part of the energy wasted is energy which results in deformation below the critical strain. If the rock is strained below its critical value, the energy input is released as heat when the strain is removed, and no rock breakage results. In order to obtain the highest mechanical efficiency, the operating conditions should be so regulated that the imposed stress results in deformation beyond the critical strain in the greatest possible number of contacts.

Rock is ordinarily broken under compression, but shearing and tensile forces can also result in breakage. It is only necessary that the resultant of the induced strain exceed the critical breaking strength in the same direction.

Young's modulus of elasticity, or stress/strain is about 10,000,000 lb. p.s.i. for average rock, whose compressive strength is 20,000 lb. p.s.i. When the compressive strength is divided by the modulus of elasticity, it is seen that average rock must be deformed .002 in. per inch of thickness before breakage. Since work is average force times distance, the work theoretically required to break a one-inch cube of average rock is 10,000 × .002, or 20 inch-pounds. The net work required to break is theoretically proportional to one-half the square of the compressive strength divided by the modulus of elasticity in compression.

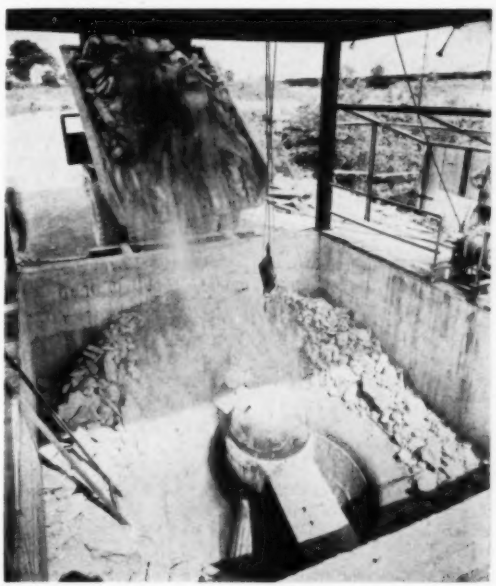
The reduction ratio is the feed size divided by the product size. The number of pieces of product formed from one piece of feed equals the cube of the reduction ratio. If it is assumed that the minimum break necessary to relieve the strain is the breakage of one piece into 8 pieces, with a reduction ratio of 2, then the theoretical work input required is proportional to one-half the square of the compressive strength divided by the modulus of elasticity and multiplied by the reduction ratio minus 1. The new surface area formed is also proportional to the reduction ratio minus 1; however, the surface area formed in crushing a given quantity of rock is inversely proportional to the feed size, while the theoretical strain energy input is independent of the feed size. According to the surface energy theory, the efficiency of crushing and grinding is the ratio of the surface energy produced to the kinetic energy expended.

The controversy between the strain energy and surface energy (or modified Kick and modified Rittinger theories) is still active. Experimental evidence is far from conclusive because crystal structure and zones of weakness make the larger particles relatively easier to break, while surface area measurements of fine particles are not exact. However, the evidence indicates that nearly all of the energy input required goes into shape deformation and resulting heat, rather than into the production of new surface energy, and that the new surface area produced is roughly proportional to the energy input. Perhaps the accepted explanation will be a compromise between the two theories, whose logic is not now apparent.

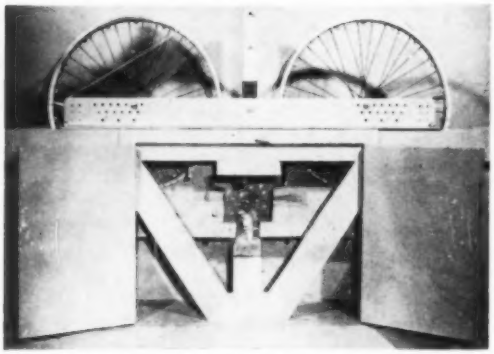
The modulus of elasticity of iron and steel is 29,000,000 to 30,000,000 lb. p.s.i., which is approximately three times that of average rock. It follows that in crushing rock, one-fourth of the total energy input goes into deformation and heating the metal crushing faces, and three-fourths into the deformation of the rock.

Any theoretical calculations of the strain energy required to crush or grind should be increased by the necessary deformation of the metal surfaces. It should also be increased by the work necessary to wear away the metal removed, which is a highly indeterminate quantity at present.

A 42-in. gyratory crusher installed in a crushed stone plant.



*This paper was presented at the 34th convention of the National Crushed Stone Association in Cincinnati last February.



The pendulum impact testing device in the Allis-Chalmers Basic Industries Laboratory.

Particle Size Relationships When a homogeneous crushed or ground product is screen analyzed on sieves in the Tyler $\sqrt{2}$ sieve scale and the percent passing is plotted on a logarithmic scale against the successive screen sizes on a linear scale, a straight line with a slope m results. It follows the equation

$$Y = 80 \left(\frac{x}{K} \right)^{m} \quad \ldots\ldots\ldots (1)$$

where Y is the percent passing any diameter x, and K is the diameter which 80 percent passes. Variations from a straight line indicate natural grain sizes, crystal sizes, and other structural features of the material.

The size which 80 percent passes has been chosen as a convenient measure of the effective particle size, and can be found readily from the plotted screen analysis. The size which 100 percent passes is not a satisfactory criterion, particularly since the largest particles are usually slabby and do not follow the straight-line plot. The reduction ratio is taken as the size F, which 80 percent of the feed passes divided by the size P which 80 percent of the product passes. The reduction ratio is constant for all sizes when the plotted size distribution lines of the feed and product are parallel.

Energy Requirements Theoretical explanations of crushing phenomena have not been of much value in predicting crusher performances. The principal reason for this is the wide variation in rock structures, and the existence of various structural zones of weakness which may make large pieces of rock relatively easier to crush than the same amount of smaller pieces. Measurements of compressive and impact crushing strengths are made on pieces of specified sizes, and the results of duplicate tests may vary widely, so that the average of several tests is required to evaluate the crushing resistance at the feed size used.

The compressive strength in pounds per square inch is obtained by breaking one-inch cubes or drill core cylinders under slow compression. Variations are large because of differences in rock structure and possible invisible cracks from explosives, so that the average of four or more cubes should be used. The compressive strength indicates directly the type of crusher construction necessary, and furnishes an indication of the expected power required to crush.

A better indication of the power required is obtained by impact crushing tests, in which broken pieces of rock are reduced by impact between two opposing pendulum hammers.[1] The average impact crushing strength of ten minus 3 in. plus 2 in. pieces is reported in foot-pounds per inch of thickness. Within certain limitations this furnishes a fair indication of the power required to crush. Large pieces may contain cracks or fissures not present in the size tested, and thus require less power than the test indicates. If the material packs in the crushing chamber, the power required increases greatly, and may far exceed that indicated by the test.

Comparative plant results indicate that the power required for various types of crushing and grinding machines does not vary as widely as might be expected.[2] Jaw and gyratory crushers, rolls, hammer mills, rod mills, and ball mills require

$$\text{HPHrs/Ton} = K_1 \sqrt{\frac{\sqrt{RR}}{P}} \quad \ldots (2)$$

Where RR is the reduction ratio at the 80 percent passing size, P is the size in inches which 80 percent of the product passes, and K_2 is a constant which equals 0.25 for soft, 0.50 for medium, and 1.00 for hard material. The approximate energy input required to crush can be calculated from this empirical equation, provided that the relative crushing resistance of the material can be accurately evaluated.

Particle Shapes of Crusher Products The shapes of crushed rock particles are highly irregular. The particle of unit volume having minimum surface area is a sphere, and crushed particles vary from this theoretical minimum to cubical, rectangular, tabular, and acicular. Particles which combine sharp corners with minimum surface areas per unit volume are commonly designated as cubical and usually constitute the most desirable rock products; since they combine good interlocking properties with good individual particle strength.

Comparison of particle shapes by visual observation usually suffices. However, a more exact method which yields quantitative data is available.

The largest particle dimension is designated as A; B is the largest dimension at right angles to A; and C is the largest dimension at right angles to both A and B. Dimension B is determined by screening on square hole sieves, although round holes would be more accurate. C is determined by screening on slotted openings. A is the most difficult dimension to determine, but it can be calculated from the particle weight, the specific gravity, and the known value of B and C.

If B is designated as unity for each size fraction, then for average stone A will be about 1.7 and C about 0.7. When the crusher product is slabby or tabular C may decrease to 0.3 or less, and if it is needle-like or acicular A will increase to 3 or more.

The particle shape depends primarily upon the type of particle being crushed, but it is affected by the speed, throw, reduction ratio, crushing chamber shape, and other crushing factors, as will be mentioned later.

APPLICATION OF CRUSHERS

The following sections discuss the crushing operations in general, and more specifically, the application of certain types of crushing equipment to the production of sand.

[1] Bond, Fred C., and Wang Jen-Tung: *A New Theory of Comminution*, A.I.M.E. Trans. Vol. 187.

[2] Bond, Fred C.: *Crushing Tests by Pressure and Impact*, Trans. A.I.M.E., (1946) 169, 58.

General Classes of Crushing Equipment Crushers are usually divided into four general classes—gyratory, jaw, double or single roll and hammermills, and then considering the production of sand, possibly a fifth should be added—the rod mill. Normally the rod mill is not considered a crusher, but because of its wide use in the production of sand, it should be considered here for the sake of comparison and completeness.

These classes can be still further divided by referring to the respective stage of application of the given piece of equipment, such as primary, secondary, tertiary and quarternary, or fourth stage.

In this paper, crushing equipment will be discussed in terms of both its class and the stage of application.

Primary Crushing Normally jaw, gyratory, and single rolls are usually considered as primary crushers, although recently variations of hammermills have been developed which fall into this classification.

We do not propose to go into the selection of the type of primary crusher at this time except to mention that many factors, including the material to be crushed, plant capacity, size of original feed, location of crusher, handling facilities, etc., must all be considered.

There are, however, several aspects of the primary stage of any crushing plant which can be considered in light of their effect on the final product. For example, a jaw crusher will usually produce a slabbier product than a gyratory crusher. This is usually attributed to the rectangular discharge opening of the jaw crusher contrasted to the annular one of the gyratory crusher. In many cases the slabbiness resulting from the primary stage can be reduced by the judicious selection of the following crushers; in other cases this slabbiness is carried down through all the following stages. Of course, the nature of the material being crushed has considerable bearing on the slabbiness.

The elimination of primary fines may do considerable to eliminate slabs in the final product. This is understandable when one considers the usual and sensible practice of scalping out the product size material ahead of each successive stage of crushing. If the primary fines contain a high percentage of slabs, as may be the case, and if they are not removed, they will pass on through the plant in their original form and end up in the final product.

Experience has shown that too great a ratio of reduction in any given crushing stage will result in the production of an excessive amount of fines and slabs. This is more apparent and of more importance in the later crushing stages, but nevertheless holds for primary crushers as well.

Secondary Crushers Secondary crushers are usually either gyratory crushers of a design similar to primary gyratory crushers, but having modified crushing chambers, or they are cone type crushers. Technically speaking, the former is the true secondary crusher, while the latter is either a tertiary or quarternary crusher, and the discussion under this heading will be limited to the gyratory crushers which have been adapted to secondary crushing through modification of the crushing chamber.

A brief discussion of the various types of crushing chambers is in order. There are in general three types of crushing chambers which may be defined by referring to the design of concaves.

First, there is the straight type in which both the concaves and the crushing head are virtually straight. In any given crusher, this form of crushing chamber will give the maximum feed opening for a given angle of nip between the crushing surfaces.

Second, there is the modified non-choking, or more correctly defined, modified straight or uniform wearing crushing chamber. This chamber, if designed for the same feed opening as the straight type, will have a slightly larger angle of nip, but due to a slight curve at the bottom of the chamber, will have a higher rated capacity. For a given chamber, the minimum setting is the same for either the straight or modified straight chamber, and the feed can be either scalped or contain the primary fines.

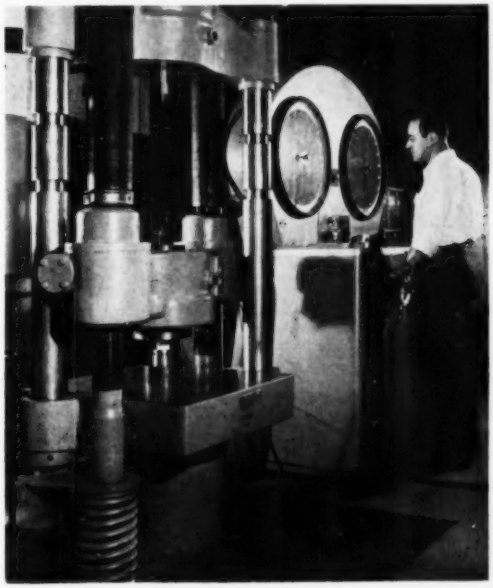
The third type of crushing chamber, the full non-choking, may require some sacrifice in feed opening in order to maintain an acceptable angle of nip. However, due to the full curve in the bottom of the chamber, it will have a higher capacity and can be set closer than either of the two previous types of chambers. The feed to a crusher with full non-choking chamber should have the fines removed in order to prevent packing and high horsepower consumption.

Little can be said about the difference in the product from the three different types of chambers. Theoretically, the product from the full non-choking chamber should be more slabby than from the other two, but practically speaking, there is no difference.

Tertiary and Quaternary Crushers These crushers normally comprise the last stage of crushing, and usually consist of cone crushers, double rolls, hammermills, and in order that the picture of sand making apparatus is complete, rod mills. The relative merits of each are discussed.

Hammermills almost invariably produce the most cubical product of any crusher, but on abrasive materials the maintenance is high. The selection of a hammermill is frequently an economic one with low initial cost for relatively high capacity ma-

A compression testing machine.



chines balanced against higher maintenance costs. A good sand product can usually be obtained from a hammermill, although in some cases an excess of fines may be produced. Also the gradation of the product may be poor and considerable blending may have to be resorted to if a rigid product specification must be met. The material should be relatively dry, and as mentioned before, care must be exercised when selecting a hammermill, as far as the abrasiveness of the stone is concerned.

Allis-Chalmers has made a considerable search for a suitable laboratory abrasion test by which it might be possible to predict the wear in a hammermill under actual operating conditions. To date, nothing has been developed which will give us this sort of information.

Cone crushers of various manufacturers are probably the most widely used tertiary crushers; and they have been used for the production of sand, although it is usually felt that the product required is somewhat finer than can be economically produced in a cone crusher. Most sand specifications call for minus 4-mesh material, and it has been our experience that production of this size material in any quantities in cone crushers is beyond the limitations of good crushing practice. Cone crushers provide the ease of adjustment and tramp iron protection required in a tertiary crusher and are considered high-capacity units. The product, although not normally as cubical as that from a hammermill, can be made quite satisfactory, particularly if care is exercised in the application of the crusher. Our experience has indicated that the production of a cubical product is to a greater or lesser extent dependent upon the eccentric throw of the crusher—the greater the eccentricity with respect to the setting, the more slabby will be the product. A crusher with a small throw is more likely to produce a cubical stone than one with a larger throw. However, everything else remaining equal, a small throw means a small capacity. With an increasing demand for fine stone and sand, all too frequently a larger capacity is selected, to the detriment of quality.

Double roll crushers are frequently used for the production of the finer sizes of crushed stone and sand. They have the required tramp iron protection, and can handle damp or sticky materials better than any other tertiary or quarternary crushers. They are, for the most part, rather difficult to adjust, and require considerable care in their operation, especially the feeding arrangement, if grooving and uneven wear of the roll surfaces are to be avoided.

Crushing rolls will probably produce fewer fines than either hammermills or cone crushers, but at the same time, the product is apt to contain more slabs than that of either of the other two types of crushers. Because of this, the product will frequently not pass U. S. Engineers' specifications.

Some work has been done using differential speed rolls with speed ratios of up to 2:1. Considerable improvement of the product usually results and the slabbiness is reduced, but the wear on the roll shells increases to the point where the economies are doubtful.

The use of hammermills, cone crushers or crushing rolls in the production of sand almost invariably requires closed circuit crushing, and it might be well to outline some of the advantages and disadvantages of this procedure. It might be said that it is well to avoid this wherever possible, although it does have some advantages and is mandatory if a definite top size limitation exists. By the use of closed circuit crushing the production of fines can be reduced somewhat and it is likely that the slabbiness, especially in the larger sizes, will be somewhat reduced because these slabs will be returned to the crusher, where their chances of becoming broken are increased. The undesirable features of closed circuiting are economic ones. The capacity of the crushing equipment must be increased in order to handle the circulating load, or conversely, the capacity of the individual machines will be reduced by the amount of the circulating load. Additional conveying and screening equipment is required, which increases initial cost and also operating and maintenance costs.

Rod mills are usually considered under the subject of grinding, rather than crushing, but in many instances their application completely overlaps that of certain crushers. This is particularly true in the manufacture of sand where both the feed size and range of product size duplicates that of a certain crusher. It is for this reason that rod mills are being injected here.

Overflow, end peripheral, and center peripheral rod mills have been used extensively for the production of sand. These units do have certain advantages over crushers. The product will be practically as cubical as that from a hammermill, but more cubical than that from a cone crusher, or a set of rolls. It will normally make somewhat less fines than will a hammermill, but more fines than the cone crusher or rolls. It can be adapted to either wet or dry processes. The gradation of the product will usually more closely approach that of the desired specification, with the result that less blending will be required in order to obtain an acceptable product.

The original cost of a rod mill installation, either wet or dry, is greater than for any other type of equipment, but maintenance is lower.

The biggest advantage of a rod mill lies in the number of ways in which the final product can be controlled. The feed size (which normally lie sbetween ¾-in. and ⅜-in.), the amount of water (i.e. dilution), the rod charge, the mill speed, etc., are all factors which can be varied to produce changes in the final product. Rod mills tend to give a higher percentage of the finer sizes which are frequently lacking in a crusher product. They usually can be applied in such a way as to permit open circuit milling, with the amount of oversize falling within specifications, something which cannot usually be done in a crusher. The extreme fines may have to be removed from the final product through wet or dry classification.

Summarizing the above, our experience has indicated that the most cubical product will be produced by a hammermill followed by a rod mill, a cone crusher and a double roll crusher in that order. Maintenance will probably be highest on a hammermill; followed in order by crushing rolls, cone crusher, and rod mill. The control of the product is the greatest with rod mills, and there is little difference between the control obtainable with any of the crushers. The initial investment is greatest with the rod mill.

The preceding constitutes a brief but fairly comprehensive resume of the theory of crushing and the applicaton of crushers, specifically with reference to the production of sand. Comments made are frankly general ones, and they should be used only as guides when applying them to specific crushing operations. As you know, the nature of the material being crushed is a major factor, especially where the production of crushed products to meet definite specifications is considered. We do not claim that the above is the latest word, but only represents a brief summary of our experience.

There are some very definite problems which have not been touched upon and upon which considerable

(*Continued on page* 178)

On the *TOUGH* Jobs Operators know

JALLOY HEAT-TREATED PLATES

J&L STEEL

. . . resist impact, abrasion and corrosion

. . . provide longer service life, lower maintenance costs

Cost-conscious quarry operators throughout the industry are cutting maintenance and downtime costs by installing tough J&L Jalloy heat-treated steel plates on their equipment.

They've found that on the tough applications heat-treated Jalloy lasts 4 to 20 times longer than mild steel. The reason—Jalloy has the physical properties to resist the severe impact, abrasion and corrosion of quarrying operations. It is produced with a yield strength of 160,000 lbs. per sq. in. and a Brinell hardness of 341 to 388. The result—Jalloy saves money by cutting steel requirements, reducing downtime for repairs and replacement, and keeping labor costs for maintenance to a minimum.

Here are some of the applications where quarry operators are using heat-treated Jalloy—Dump Truck Bottom Liners, Rock, Sand and Gravel Chute Liners, Dipper Stick, Shovel and Drag Bucket Reinforcing. You can get Jalloy in bar form and in plates up to 72″ wide and 20′ long with thicknesses from 3/16″ to 1½″.

Start finding out more about Jalloy today. Just write to Jones & Laughlin Steel Corporation, 465 Jones & Laughlin Building, Pittsburgh 30, Pa. We'll send you a free copy of our booklet, "For Longer Wear . . . Less Repair!" It will give you more complete information on the properties, heat treating and workability of heat-treated Jalloy, the modern mining and quarrying steel.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

work and experimentation must be done. Some of these problems are the removal of soft stone, the separation of slabs from a crushed product, and the subsequent retreatment of these slabs in order to obtain a saleable product. These are problems which are becoming increasingly important, but to which considerable study is now being given.

personal mention

SAMUEL OMASTA joined the staff of the National Agricultural Limestone Association on May 7 as assistant executive secretary, succeeding Edward J. Brunenkant, who resigned from this post on April 30. Mr. Omasta has been associated for ten years with the Department of Agriculture, working on the Conservation Materials and Services Program.

CHARLES CASPER, manager and secretary of the Northern Indiana Sand and Gravel Company, Wolcottville, Ind., was elected governor of district 25-B of the Lions Club at a recent Indiana convention.

W. M. THORNTON, president of the Longhorn Portland Cement Co., San Antonio, Tex., has been elected a director of the Alamo National Bank of the same city.

CHESTER S. CRAWFORD, a former vice-president of the Lehigh Portland Cement Company, has been named executive vice-president of the Whitehall Cement Manufacturing Company in Philadelphia.

Russ A. Loveland, well known in the cement industry for the last 25 years, has been named works manager for the Halliburton Portland Cement Company at Corpus Christi, Tex., replacing A. J. Anderson.

H. N. STEPHENS, director of research for Minnesota Mining and Manufacturing Co., St. Paul, was elected president of the Industrial Research Institute at its recent meeting in Washington. A former assistant professor of chemistry at the University of Minnesota, Mr. Stephens has been 3 M's research director since 1937.

EUGENE F. KINDLER, cost accountant for the Minnesota Mining & Manufacturing Co., St. Paul, Minn., has been elected treasurer for that organization. New directors elected are DONALD E. FORSCHLER, ARNOLD J. RYDEN JR., RAYMOND E. SMITH, FRANCIS X. STOCKER, and A. E. ZATARGA.

Officials of the Bessemer Limestone and Cement Co., Youngstown, O., have announced the following appointments: ALLAN E. HARPOLD, sales manager, and GEORGE W. BRUNDAGE, assistant sales manager and traffic manager.

In addition to the re-election of all present officers, the stockholders of The Warner Co. recently named CHARLES WARNER JR. and ROBERT G. RAUSCHER as vice-presidents. JAMES E. HEWITT was elected secretary.

Charles Warner Jr.

Mr. Warner will continue to serve as treasurer, and in addition has been elected to the executive committee. His election rounds out almost 27 years with the company, most of these being spent on company financial matters. Mr. Rauscher, who will continue to serve as comptroller, has been handling taxation matters for the company since the 1920's.

R. G. Rauscher

J. E. Hewitt

Officers of the Ideal Cement Co. of Denver, Colo., elected at a recent director's meeting are C. K. BOETTCHER, president; CRIS DOBBINS, executive vice-president; M. O. MATHEWS, vice-president and general manager of the Southern Division; C. W. BALLANTYNE, secretary and treasurer; and O. F. COUNTS, comptroller.

LEE MCCOURT, chairman of the Fischer Lime & Cement Company's board of directors, recently was appointed chairman of the Industrial Department of the Memphis Chamber of Commerce.

The U. S. Gypsum Co. has transferred MILES PRESKITT to the Fort Dodge, Ia., plant with a promotion to manager of the board plant. He will be succeeded by L. A. PURSELL as superintendent of one of the firm's two sheetrock wall board manufacturing plants in Sweetwater, Tex.

ALWYN W. OGDEN of the Universal Atlas Cement Co. was elected treasurer of the Office Executives Association at the May 9 meeting of that association in New York City.

FRANK L. STELLNER of Evanston, Ill., has been appointed director of purchases by the United States Gypsum Co., succeeding the late John P. Sanger, vice-president in charge of purchasing.

MEADE M. MORRIS, manager of gypsum sales for the Celotex Corp., retired as president of the Gypsum Association at that group's annual meeting held recently in Chicago. Mr. Morris becomes promotion committee chairman for the association.

RUSSELL W. HUNT, president and general manager of the Southwest Lime Co., Neosho, Mo., has been elected president of the Tri-State Traffic Club for 1951.

Election of four new members to the junior board of directors of Dravo Corporation, Pittsburgh, Pa., has been announced. They are A. J. BROSIUS, assistant to the vice-president of Union Barge Line Corporation; K. C. COX, engineer, The Contracting Division;; F. J. LLOYD JR., operations manager of the Keystone Division; and B. B. Reilly, manager of the Air Conditioning and Combustion Department.

A recent visitor at the Halliburton Portland Cement Company's plant at Corpus Christi, Tex., was DR. CARLOS V. ALMANZAR of Bogota, Colombia, general manager of a portland cement firm of that city.

LOUIS C. LERNER of Lerner & Co., Boston, has been elected vice-president of the Victoria Gypsum Company, Ltd.

Two recent appointments announced by officials of Featherlite Corporation, Dallas, Tex., are as follows:

J. HENRY DAVIS, formerly a supervising engineer in private industry and on government projects, was appointed assistant to the chief engineer in charge of production at Featherlite's Strawn plant.

KEY W. RYAN was named to the engineering sales division. He was formerly associated with the Stewart-Warner Corp.

The Board of Directors of Marquette Cement Manufacturing Co., Chicago, Ill., have elected PAUL DUNCAN as assistant secretary and treasurer of the company. Mr. Duncan, who has been with Marquette since 1933, will continue to serve as head of the accounting department and comptroller.

JOHN M. GRIFFITH, chief of bituminous and chemical section, United States Corps of Engineers at the Waterways Experiment Station, Vicksburg, Miss., for the last eight years, has been appointed engineer of research for the Asphalt Institute, with headquarters in New York City.

J. M. Griffith

Mr. Griffith succeeds Prevost Hubbard, retired, as head of the institute's laboratory and field research. He is an associate member of the American Society of Civil Engineers, a member of the Association of Asphalt Paving Technologists and other technological groups, and is a registered professional civil engineer.

W. S. DuBois

WILLIAM S. DUBOIS, formerly senior market analyst for the Firestone Tire and Rubber Co., has joined Harbison-Walker Refractories Company, Pittsburgh, Pa., to head the newly established Department of Market Research.

The new department, created primarily with the customer's interest in mind, will evaluate customer needs for new and existing types of refractories and consider the means of developing and manufacturing these products in commercial quantities at prices the customer can afford to pay.

IRVING WARNER JR. has been appointed general manager for the Warner Co. in the Morrisville, Pa., area. HERMAN M. EGNER, general superintendent of Warner's Philadelphia Retail Division, will take over Mr. Warner's duties supervising marine transportation and maintenance.

EMORY M. FORD, president of Huron Portland Cement Co. and chairman of Wyandotte Chemicals Corp., has been elected to the board of directors of the Universal Products Co., Inc., Detroit, Mich.

A. L. MEYER has been named administrative assistant to the general sales manager of Certain-teed Products Corp., Ardmore, Pa. He will continue as merchandise manager of the gypsum and allied products division.

According to an announcement released by the Hercules Cement Corporation of Philadelphia, Pa., WARREN L. BREINIG SR. was recently elected vice-president for production.

PAUL DUNCAN was recently elected assistant secretary and treasurer of the Marquette Cement Manufacturing Company. Mr. Duncan has been associated with Marquette since 1933, except for two years spent with the armed forces during World War II. He will continue to serve as head of the accounting department.

The Freeport Sulphur Co., New York, N. Y., has announced the appointment of K. T. PRICE as assistant vice-president and Z. W. BARTLETT as assistant general manager of southern operations. B. A. AXELRAD was promoted to the post of general superintendent of the company's Hoskins Mound, Tex., plant.

LLOYD H. YEAGER, general manager of the Gypsum Association, Chicago, Ill., recently received from the American Standards Association a certificate of service in recognition of his work in the development of American standards.

obituaries

C. ROY BINKLEY, vice-president of Binkley Brothers, Inc., Dry Run, Pa., died recently of a heart attack. Mr. Binkley was a director of the National Agricultural Limestone Association.

C. S. Wicker

CARLTON S. WICKER, 60, for many years sales manager of Buffalo Slag Co., Inc., died May 17 at his home in Buffalo, N. Y., after an illness of about a year.

Widely known in civil engineering and construction circles, Mr. Wicker had been associated with the Buffalo slag concern for 32 years.

In World War I, Mr. Wicker was with the 16th Corps of Engineers and served 2½ years in France.

Mr. Wicker joined Buffalo Slag in 1919 as sales engineer and later was promoted to sales manager. He served in the armed forces in both World War I and World War II.

He was a pioneer in the Buffalo area in the introduction of slag concrete for construction purposes. He was a member of the Society of American Military Engineers, the American Society of Civil Engineers, American Railway Engineers Association, American Concrete Institute, American Society of Testing Materials and the Problem Committee of the National Slag Association.

LENNART K. MARTINSON, manager of the Washington, D. C., branch of the Lone Star Cement Corporation, died on April 30 in a local hospital. Mr. Martinson, a native of Brooklyn, was 37 years of age.

HERMAN C. BARTZ, superintendent of the Chicago Gravel Company's Plainfield, Ill., plant, died on April 8. Mr. Bartz, who had been employed by the Chicago Gravel Company for 33 years, was 53 years of age.

JOSEPH F. PENDER, 66, Kansas City, Mo., died at his home on April 15. Mr. Pender was a representative of the General Pumice Corporation, Santa Fe, N.M.

JAMES W. CALLAHAN, 62, for 17 years production manager of the Gravel Products Corp., Buffalo, N. Y., died on March 17 at his home after an illness of several months.

He was born in St. Paul, Minn. Before joining the Gravel Products firm, he worked for the Superior Products Corp. of Detroit.

PHILIP J. REES, 45, who operated the Phil Rees Sand and Gravel Company at Des Moines, Ia., died of a heart attack on May 4 at his home.

MELVIN MILLER, an employee of the Walters Sand and Construction Company of Iola, Kan., was killed on May 3 when the banks of a ditch in which he was working caved in on him. Recent rains were blamed for the 30-ft. slide which filled the ditch.

CHARLES L. RUFFIN, 85, president of the Massaponax Sand and Gravel Corporation of Fredericksburg, Va., died on June 3 in a hospital at Richmond, Va.

CARL WHITWORTH, 37, superintendent of the Bituminous Materials Corporation, Clinton, Ind., was stricken fatally by a heart attack on May 31 while visiting the Terre Haute Sand and Gravel Company in Terre Haute, Ind.

new machinery and supplies

● Approved Additive

"Ertrane C" has met all the ASTM tests for an approved air-entraining additive for portland cement, according to statements from the manufacturer, the Nopco Chemical Company, Harrison, N. J.

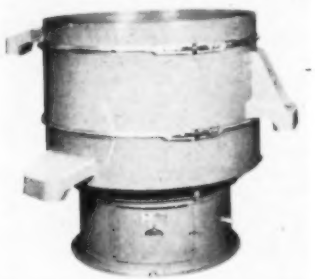
Ertrane C is readily soluble in water and can be used within 30 minutes after preparation. The material is said to increase plasticity, water repellency, and storage life. It is claimed that cement treated with the compound will not cake during long storage periods. Ertrane C may be added during the manufacture of cement or during the mixing of concrete.

Independent laboratory tests show that Ertrane C fulfills all requirements of ASTM Specification C226-50T and is fully accredited for use in cement made in conformance with ASTM Specification C175-50T.

● Circular Vibrating Screen

Either wet or dry separation on a production basis is being achieved with laboratory accuracy by a radically new type of vibrating screen known as the "Sweco Separator." It is a product of the Southwest Engineering Co., Los Angeles, Calif.

Built in single- or multiple-deck models,



the separator utilizes an entirely new screening motion on circular decks to attain high capacity and efficiency.

The separator employs a compound, gyratory motion whereby every portion of the screen is simultaneously vibrated in horizontal, radial, and tangential planes, tumbling (not bouncing) the material and propelling it in a spiral path from a central feed point to a peripheral discharge. In multiple screening, undersize from each deck returns by cone to the center of the next lower screen and the sizing process is repeated. High-volume production is especially noticeable in the 100-mesh (dry) and 200-mesh (wet) ranges. Particularly satisfactory results have been noted in installations involving the sizing of raw perlite, pumice, silica, and the medium-to-fine fractions of concrete sands. Separations are reported to be clean and exact. Cloth life has so exceeded expectations that the manufacturer guarantees wire-screen cloths against wear for a period of 60 days.

Standard units are supplied in 48-in. diameter. Except for the top, the unit is totally enclosed. If desired, a cover with feed spout is supplied for full enclosure. A 1-hp. dustproof motor is built in.

● Wire Rope Sockets

Farrell's 85 alloy steel is the material used to manufacture the line of wire rope sockets made by the Farrell-Cheek Steel Company, Sandusky, O.

The standard sockets feature no-slip bonding grooves in the cableways to facilitate a more secure bond of zinc or babbitt in socketing the cable. The wedge type features a full round ropeway that forms a contoured grip of the wire rope without any tendency to crush and flatten the strands. All of the sockets are electric-furnace-cast steel, heat-treated for additional strength.

● Mine Communication Set

Mine communication between fixed stations, between fixed stations and locomotives, or between locomotives operating on a common current supply is possible with a new system developed by General Electric, Schenectady 5, N. Y.

The system provides two-way voice communications by means of an FM transmitter-receiver using carrier-current. The unit is self-contained in a steel case and is completely assembled for plug-in installation. Power is supplied by a standard storage battery charged from the power supply line. Loud-speaker calling system and telephone-type handset equipment is used.

● Fine Sand Separator

Fine sand separation is a simple and economical process with the "Whirlcone," which combines the well-known principle of cyclonic separation with suction to remove slime, water, and unwanted substances from sand and similar materials.

The device consists of a spiral chamber where the incoming pulp is given a spiral motion before passing into the conical lower section. Here the heavier sand settles out and is withdrawn through a controllable gate at the bottom.

Water, slime and unwanted material is drawn from the central overflow pipe by suction overflow. Raising the Whirlcone above the waste outlet creates the siphoning action. Control of the overflow is by adjusting the height of the overflow pipe from the base of the cone.

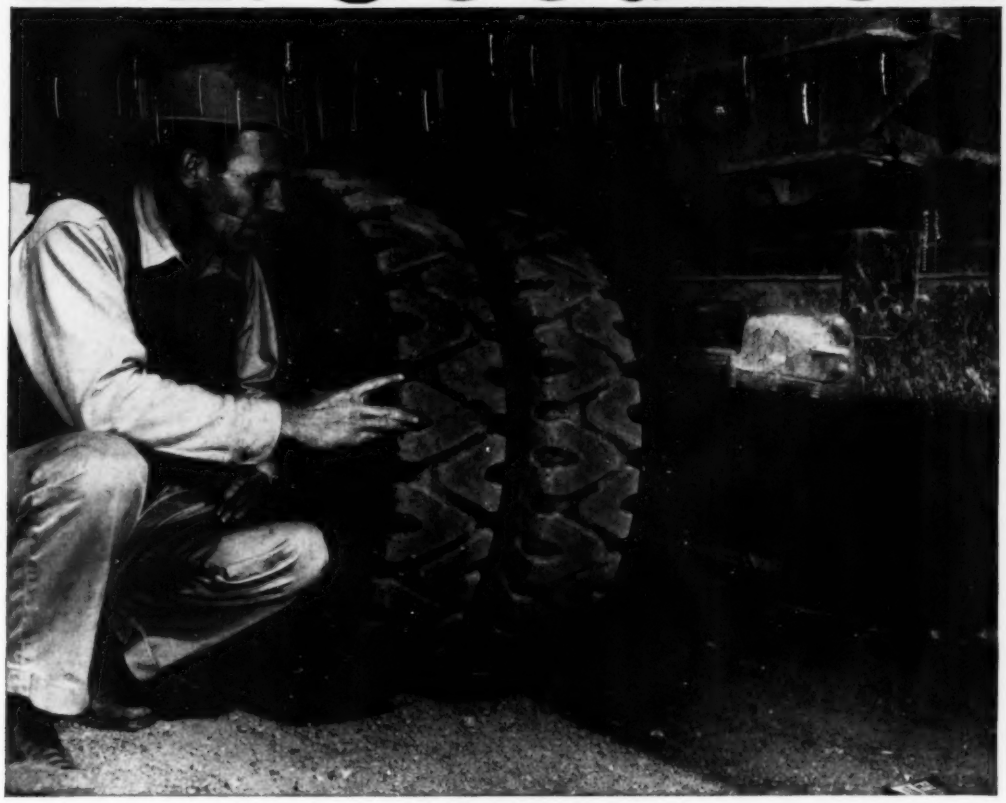
The Whirlcone is lined with rubber, backed with steel for abrasion resistance. It is sold by the Georgia Iron Works, 605 12th Street, Augusta, Ga.

● Lubricant Sprayer

The "Trabon Spra-Lube Valve" is designed to spray measured amounts of lubricant on open gears, slides, and similar places. The device consists of a valve in which the air valve is opened by the flow of lubricant. The air and lubricant are then piped to a mixing nozzle and sprayed onto the open surface.

The Spra-Lube is said to be adaptable to existing systems, or it can be operated from a hand grease gun and pressure fitting located on the machine. This device is the product of the Trabon Engineering Corporation, 1814 East 40th Street, Cleveland 3, Ohio.

B.F.Goodrich



These tires give less trouble —more recaps!

THE ARISS-KNAPP COMPANY of Oakland, California, is engaged in excavating and hauling dirt, rock and gravel in the San Francisco Bay area. They operate 5 semi-dump trucks, 9 regular dump trucks, 2 motor graders and 1 tractor-low-bed trailer. Hauling heavy loads over dirt, gravel, rock and a mixture of all types of roads, the drive wheels of these trucks are all equipped with B. F. Goodrich tires.

Grading contractors operate in all kinds of weather. When dirt surfaces are wet, traction is especially important. Ariss-Knapp has found that the BFG Universal tread offers extra safety. J. A. Wagnon, one of the drivers, says that he likes the way these tires grip and describes them as "really terrific" on all types of driving surfaces.

Then, too, the patented B.F.Goodrich *nylon shock shield* gives added safety . . . added miles. These strong, elastic nylon cords between the tread rubber and the cord body absorb and distribute shocks evenly. It's an exclusive BFG feature that's provided at no extra cost in all tires of 8 or more plies.

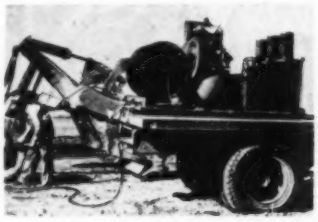
Contractors everywhere have found that B. F. Goodrich tires give maximum performance in all operations. They've found that they have fewer road delays and can recap more often. For any on or off-the-road service where extra traction and bruise resistance is necessary, see your local BFG dealer—or write for information. *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

● Field Lubricators

Designed for handling the heaviest greases, the new line of "Graco Convoy Lubers" features the "Powerflo" pump. The convoy lubers are available as assembled units for installation on trucks or trailers, or components may be selected and a system assembled for individual application. They are made by the Gray Company, 60-11th Avenue, Minneapolis 13, Minn.

The lubers consist of an air compressor which supplies air for operating the lubricant pumps and for tire inflation, containers for the lubricants (which may be left in original drums); air-operated pumps; and reels containing 30 ft. of hose and the necessary nozzles.



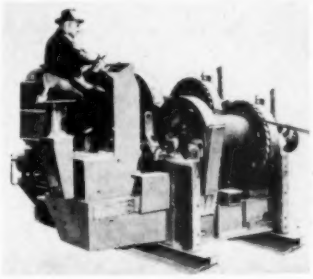
Provision may be made for handling diesel fuel as well as grease and oil. The system has been designed to provide flexibility in meeting the problems of field lubrication of machinery and equipment.

● Two-Drum Hoist

Designed for precision control of loads, a two-drum hoist is being manufactured by the American Hoist and Derrick Company, St. Paul 1, Minn.

The hoist features torque conversion, anti-friction bearings, air-operated tandem band contracting clutches, and overload regulating valves that prevent injury to the hoist if a load becomes snagged. While basically a two-drum hoist, a third drum and a derrick swinger can be added easily. There are three models available rated at 14,000, 18,000, and 25,000 lb. single line pull.

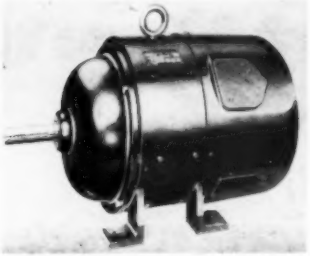
Other features include a back-up brake that automatically engages if the drive



shaft starts to reverse, ratchet rings of forged steel with compression type dogs, and a centralized control stand that is rotatable and allows the operator to watch the drums at all times.

● Explosion-Proof Motor

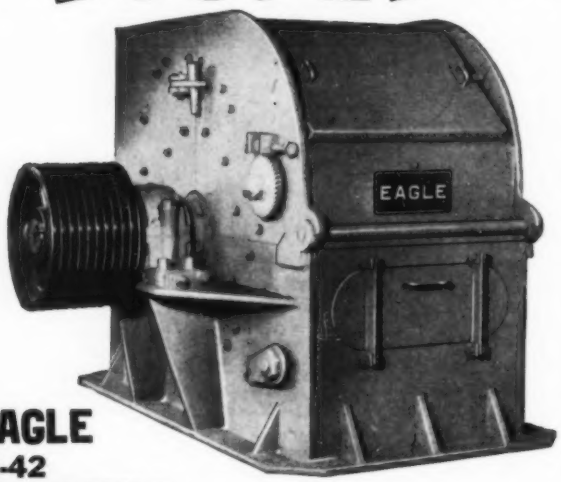
A totally-enclosed explosion-proof d.-c. motor manufactured by the Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa., is the "Life-Line," made in conformity with U. S. Bureau of Mines specifications for use in gassy and dusty



mines. It is claimed that this motor will withstand an internal explosion and will not ignite an explosive mixture outside the motor.

Features of the new line include all-steel, one-piece rolled frames; double-sealed pre-lubricated ball bearings; thermoset varnish impregnation of windings; and rotating flame seals and brass access covers. The motors are made in series, shunt, or compound windings; 230, 250, 500, or 550 volts; 850 to 3500 r.p.m.; and frames 203 and 365.

DOES DOUBLE DUTY



The EAGLE 36-42 HAMMERMILL

Why buy both primary and secondary crushers when this carefully engineered, sturdily built Eagle will answer for both? Its fast flying, super-hard hammers chew right into all comers — anything that will enter the feeder opening. Turns out any size aggregate, according to the setting, from dust to 3" stone. Unsurpassed for ag-lime production.

Look at EAGLE before you buy!

Send for complete specifications, Folder 251-107

EAGLE CRUSHER CO., Inc. GALION OHIO·U·S·A

JAW CRUSHERS • IMPACT BREAKERS PULVERIZERS · CONVEYORS · LOADERS

More Information, Please

CHECK AND MAIL THE CARD BELOW FOR ADDITIONAL INFORMATION ON NEW MACHINERY AND SUPPLIES

1. Molybdenum Disulphide as a Lubricant. A booklet containing excerpts from a number of technical papers describing the antifriction or lubricating properties of molybdenum disulphide, which acts much the same as graphite but in a more wear-resistant manner at high pressures and high velocities. A comprehensive presentation of a highly technical subject, illustrated with drawings, graphs, and photomicrographs of tests. A valuable booklet for the lubrication engineer or purchasing agent. Climax Molybdenum Company.

2. Do You Need a Conveyor? A four-page folder of photographs illustrating the various types of conveyors made such as belt, slat, screw, portable, washing, and others. In addition to conveyors, such material-moving and handling equipment as elevators, chutes, and batchers are shown. Hohl Machine and Conveyor Company.

3. Athey Force-Feed Loaders and Portable Breakers. Form A 146-72 M-451. Four pages of illustrations and accompanying text showing the various applications of the force-feed loaders in stock-piling, reclaiming, paving, and maintenance work. The supplementary work of the portable breaker in reducing macadam road surfacing for re-use is included. Athey Products Corporation.

4. Buda 161 Series Diesel Engines for all Types of Haulage Equipment. Bulletin No. 1526. Twelve pages that use drawings and photos to present the story and uses of the 161 Series 4-cycle diesel engines made by the company. The five models from range 185 to 350 hp.

The principle of the "Dyna-Swirl" method of combustion is brought out by drawings showing the successive steps in the combustion cycle. Several pages show the application of Buda engines in such equipment as scrapers, shovels, graders, trucks, and other haulage equipment. A map and list of distributors provides a ready guide to anyone seeking service or parts information. The Buda Company.

5. Hydrocone Crusher. Bulletin 07B7145B. This 32-page bulletin describes the "Hydrocone" line of hydraulically adjusted crushers for fine crushing of ore and stone. Operation, application, and specifications of the crusher are covered in the bulletin. Drawings illustrate the three shapes of grinding chambers available and the many construction details of the entire crusher. Capacities of the various sizes are shown in a table, while curves illustrate the product screen size. Graphs and tables on feed size, capacity, product size, and operating conditions are provided to permit selection of the right Hydrocone crusher and motor. Allis-Chalmers.

6. Installation, Operation, and Maintenance of Chain Drives and Conveyors. Bulletin No. 51-7. This bulletin shows how to get the most service out of sprocket chains. Illustrations show graphically the correct and incorrect ways of solving chain installation, operation, and maintenance problems. The bulletin is published on the theory that no matter how excellent a chain may be in design and construction, it will not give satisfactory service unless it is properly installed and operated . . . given periodical inspection, lubrication and adjustment. The bulletin points out the best ways of accomplishing these aims for longer life, smoother operation, and lowest cost. The Chain Belt Company.

7. Traylor Type R Jaw Crusher. Bulletin 1123. Specifications and instructions for assembly, erection, lubrication, operation and repair of the Traylor Type R jaw crusher make up the 30 pages of this bulletin. Illustrations show the crusher and some parts, while two pages of drawings serve as a graphic parts index for items which are described in the text, with instructions for assembling properly. Large type well spaced makes this an easy bulletin to read, while excellent photos and drawings have been selected to create a fine example of printed material. Traylor Engineering and Manufacturing Company.

8. Hercules Agricultural Spreader. Bulletin No. 5050. The two pages of this bulletin point out the features of the Hercules spreader for agricultural lime and fertilizer. The all-weather discharge mechanism that gives an even spread at any distribution rate is described. Hercules Steel Products Corporation.

9. Kleenslot Wedge Wire Screens. Eight pages show the manufacture and the details of the "Kleenslot" construction which creates a screen with wedge-shaped opening between the wires. The larger size of the opening immediately after the material passes the surface of the screen is the feature that prevents blinding and insures rapid screening. There are several styles of screens available in openings from .01 to .08 in. Special types of non-ferrous and alloy wires are obtainable for particular applications. Wedge-Wire Corp.

10. Esco Cast-Welded Dippers. No. 156B. Advantages of cast-welded dippers are brought out by text and illustrations in this 16-page bulletin. Color is used to highlight the features described in the brief text. The last page illustrates the dragline buckets, orange peel buckets, and dozer blades that are other products of the company. Electric Steel Foundry.

11. Trackson Tractor Equipment. Form 1106 (A-53). A new catalog that covers the full line of tractor equipment designed for use with "Caterpillar" diesel tractors. "Traxcavator" excavators, pipe layers, earth augers, "Tracloaders," swing cranes, and land clearing equipment are described and illustrated. The eight pages are full of pictures of useful applications in quarrying, mining, loading, and other applications. Trackson Company.

12. Hough Bulldozer-Shovel. Bulletin

Use This Card—Mail Today

July, 1951

PIT AND QUARRY:

Please send more information on items circled.

1.	2.	3.	4.	5.
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NAME

TITLE

COMPANY

ADDRESS

CITY STATE

More Information, Please

No. 206. Owners of International crawler tractors can readily adapt them to bulldozing and loading operations, according to this bulletin. The attachment includes the bucket and the necessary raising mechanism. This is similar to the well-known Hough "Payloader" line of wheel and crawler loaders but is designed for mounting on International crawlers of the T-6, TD-6, T-9 and TD-9 series. Stripping, stockpiling and loading are some of the additional operations that can be performed by a tractor with the attachment. The Frank G. Hough Co.

13. **A Memorable Event in Water Supply History.** The four pages of this folder are a reprint from the *Engineering News-Record*, describing the manufacture and installation of prestressed concrete steel-cylinder pipe. The pipe is used for water supply service and is under pressure of about 130 p.s.i. The pictures showing the various steps of building and laying the pipe are interesting and show clearly the various methods used. Price Brothers Company.

14. **Graco Convoy Lubers.** Catalog No. 700. Twenty-four pages bring the story of convoy lubers and accessory equipment. Complete units for servicing of equipment and machinery in the field are illustrated and described. The various components such as grease pumps, air compressors, supply tanks, drum adaptors, hose, fittings, and miscellaneous items are shown and explained. Suggestions for assembling custom units from the basic assemblies are given. The executive faced with field lubrication and maintenance problems will find this a valuable reference suggestion. Gray Company.

15. **Ty-Electric Heated Screens.** Electrically heated screens for "Hum-mer," "Tyler-Niagara," and "Ty-Rock" screening equipment are covered in this four-page folder. Electric heating of the screen wire is an easy and economical way of handling wet or damp materials to prevent blinding. The W. S. Tyler Company.

16. **Studies in Centralized Lubrication 1951.** Typical installations of Farval central lubrication systems are written up and diagrammatically illustrated. Savings on dredges, crushers, and other large machines are cited. This bulletin does not attempt to be technical. It is designed to serve as an introduction to the advantages of centralized lubrication and to provide a basis for supplying specialized information. The Farval Corp.

17. **Make This Simple Test.** Bulletin No. 47. A mailing piece that points out the principle of "crushing without rubbing." A movable cardboard model brings out the action of the crusher and graphically shows the application of the no-rubbing principle in action. Straub Manufacturing Company.

18. **The New Sweco Separator.** Bulletin 906. The compound gyratory method of screening used in the "Sweco" separator is explained, while a drawing shows the methods and materials used to create the effect in operation. Either wet or dry applications are possible, and the unit can be made dust tight if necessary. The separator is circular and self-contained. Multiple deck screening is easily accomplished. This folder is of interest to anyone who has a fine separation problem. Southwestern Engineering Company.

19. **Pettibone-Mulliken Products by Haiss, Bucket Loaders.** Bulletin No. H 75-77. Three models of bucket loaders are illustrated and described. Each model can be obtained with wheel or crawler mounting, and one features a conveyor for greater versatility. Specifications are included for the three models. Two pages contain photos of the machines in typical applications, while another features some of the optional equipment. George Haiss Manufacturing Co. division of Pettibone Mulliken Corp.

20. **9 Ways to Get More Miles Out of Your Truck Tires.** 1-7816 GP. Drawings, photos and diagrams bring out the major points of the text. Tire selection, correct inflation, load distribution, mechanical irregularities, matching and spacing of duals, care of tubes, rotation, recapping, and repairing, and driving habits are covered. An inflation table for tire loads occupies the back cover. Useful for truck drivers, maintenance men, and all others who operate or supervise trucks. B. F. Goodrich.

21. **Slackline Cableway Excavators.** General Catalog Section C. Photos are used to profusely illustrate this 28-page catalog of slackline cableway excavators. Several diagrams and drawings bring out points not shown in the pictures. Tables give capacities, power requirements, and other information about each size, while the text explains the general features. Any operator who has digging and conveying problems will find this catalog a source of much information. Sauerman Bros.

22. **Colprovia Topseal.** Two mimeographed sheets that explain the use and application of a smooth plastic coal tar pitch which is used to seal all surfaces. Foundations, roofs, silos, pavements, smokestacks, gutters, and masonry are some of the suggested places for using "Topseal." It is a water-thinned material that is unaffected by water once it has set. An allied product, "Home Groundseal," is used for sealing moisture from basement floors and similar places. Colprovia Roads.

23. **Link-Belt Flexmount Oscillating Conveyors.** No. 2378-5-51. Hot, abrasive oily, or dusty materials are all handled by the "Flexmount" oscillating conveyor, which is a trough of seamless steel or other metal that oscillates in such a way as to move the material forward in a steady flow. The folder gives specifications and suggests uses. Link-Belt Company.

24. **Simplicity, Accessibility, Portability, Efficiency.** Bulletin No. 51-27. The new "Rex" pump line is the subject of this 20-page catalog. Large illustrations are used to bring out the features of the line such as the impeller, wear plates, seal, and other features, as well as the ease of assembling. Each size is pictured, with capacities, specifications, and typical uses. While the book is primarily concerned with gasoline-powered, self-priming centrifugal pumps, electric and belt driven models are also covered. Two pages cover the "Rex" diaphragm pump for dewatering where large amounts of solids are present. The back cover illustrates some of the other equipment built by the company. Chain Belt Company.

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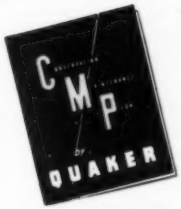
Still Going Strong Hauling Rock . . . Sand . . . Stone



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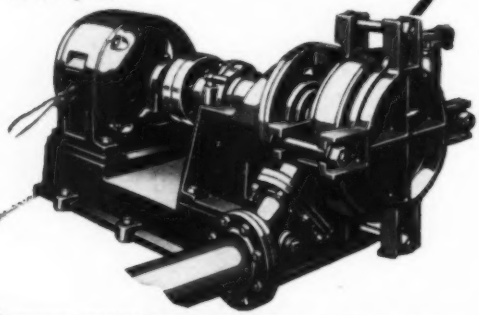
Morris TYPE "R" SLURRY PUMP

is Ideal for Cement Mills

1. **LOW PRESSURE STUFFING BOX** — Subject to suction pressure only. Maximum packing life. No high pressures to force an excessive amount of solids into stuffing box.
2. **LOW SEALING WATER PRESSURES** — Negligible dilution of slurry when pumps are properly maintained.
3. **KEEPS FLOORS AND PITS CLEAN** — No spilling of slurry past the shaft.
4. **MAXIMUM LIFE OF WEARING PARTS** — Because the alloy is selected to suit the job — because Morris' pumps are applied to give low velocities through impeller and casing — because Morris pumps operate at low speeds.



5. **HEAVY SHAFT AND BEARINGS** — Eliminate dangerous vibration due to any abnormal operating conditions — long and satisfactory bearing life.
6. **EASY TO REPAIR** — Only four bolts need be loosened to renew impeller and shaft sleeve — not necessary to disturb piping.
7. **SAVES POWER** — In many instances able to move more material per KW.
8. **NO SEPARATE OR INTERMEDIATE SUCTION TANK REQUIRED**
9. **FLEXIBLE PERFORMANCE** — Operates satisfactorily under high positive heads or, if necessary, under a vacuum through moderately long suction lines.
10. **SAVES PIPING EXPENSE AND FLOOR SPACE**—Because the Morris Type "R" allows 72 different combinations of suction and discharge nozzle positions.

For long term efficiency — and economy . . . for simplified assembly and disassembly — and a minimum of shutdowns . . . specify Morris Type "R" Pump. Free consultation with a Morris engineer at your request.

Write for Bulletin #181

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

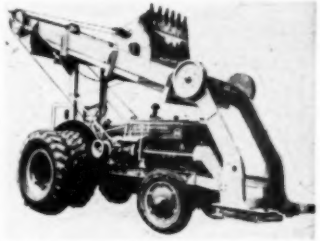
● Metallic Clutch Lining

All-metal clutch facings and brake linings for replacement use on many types of heavy equipment such as Le Tourneau, Caterpiller, Allis-Chalmers, and International tractors, scrapers and other machines are made and sold under the name of "Velvetouch" by the S. K. Wellman Company, Cleveland, O.

Velvetouch is a mixture of powdered metals formed under tremendous pressure and fused to a steel backing. It is claimed to give longer service, as there is no deterioration from oil, grease, water, or heat. The material is available in clutch linings, clutch facings, brake linings, and power control cones. Replacements linings are made to fit most standard makes of heavy equipment.

● Overhead Mobile Loader

An overhead mobile loader the "Powertrac" is adaptable to any make of tractor and converts it into an overhead loader. The machine consists of an inclined track that carries a bucket on rollers. At the lower end of the track the bucket is horizontal. It picks up a load and is drawn up the track to the back of the tractor, where it is dumped. The



bucket is controlled by one lever which directs the winch action operating from a power take-off.

As no turning of the tractor is necessary, loading is said to be speeded up to the rate of four trips a minute. The machine is made by Powertrac Equipment Corporation, 51 East 42nd Street, New York 17, N. Y.

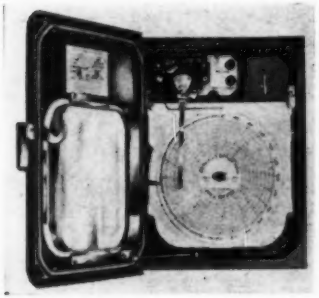
● Oscillating Conveyor

"Flexmount," an oscillating trough conveyor is being produced by the Link-Belt Company, 307 N. Michigan avenue, Chicago 1, Ill. This conveyor is designed to handle moderate amounts of loose bulk materials. It is a one-piece trough supported on flexible mountings and oscillated by an eccentric drive.

Covers for dust elimination can be provided, and discharge can be arranged at any point. The "Flexmount" is made in standard widths of 8 to 24 in. and lengths up to 100 ft.

● Recording Meters

A new measuring mechanism and other improvements are included in the Bristol "Series 500" electric recorders



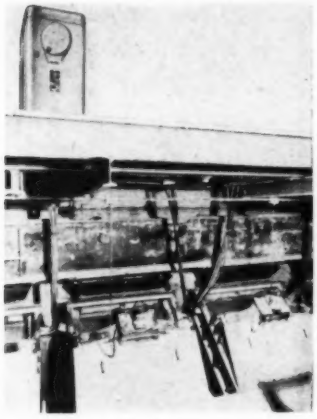
for continuously recording voltage or current on a circular chart.

Among the features of the new models are a moving-iron measuring mechanism, shock-protected stainless steel bearings, magnetic damping, and a locking device to prevent damage from rough handling. Models are available for wall mounting, surface face- or flush-mounting, open terminal or conduit connections, and pole or portable applications. The cases are moisture-, fume-, and dustproof. Bristol Company, Waterbury 20, Conn.

● Electric Screen Heater

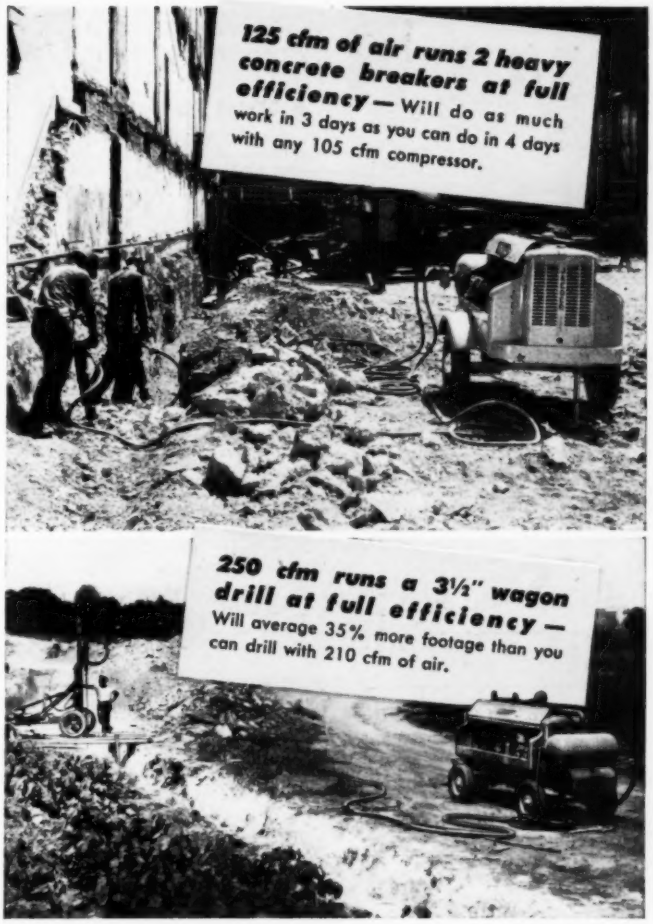
Damp materials such as sand, limestone, clay, and other minerals may be more easily screened by heating the screen wire, according to the W. S. Tyler Company, Cleveland 14, Ohio, makers of "Ty-Electric" heaters. The heated wire prevents the material from sticking and avoids blinding of the screen.

These heaters are designed to fit Humm-mer, Tyler-Niagara, and Ty-Rock



screens. The unit is said to save considerable time and trouble and to increase the capacity of the screens. It works by resistance heating of the screen wires themselves.

Your tools do 30%-40% more work with Jaeger "air plus" pressure


125 cfm of air runs 2 heavy concrete breakers at full efficiency — Will do as much work in 3 days as you can do in 4 days with any 105 cfm compressor.
250 cfm runs a 3½" wagon drill at full efficiency — Will average 35% more footage than you can drill with 210 cfm of air.

Nothing is more obsolete than 1932 model compressor ratings for operating today's air tools. Jaeger's 15% to 25% higher "new standards" provide the air you need to hold full pressure behind tools that otherwise would loaf under weak 70 lbs. pressure — or operate additional tools on work where top speed and striking power are not required. These ratings guarantee 75-125-185-250-365 and 600 cfm @ 100 psi — *at the lowest cost per cu. ft. at which you can buy air today.*

See your Jaeger distributor now — or send for Catalog SPS-1

THE JAEGER MACHINE COMPANY

602 Dublin Ave., Columbus 16, Ohio

BITUMINOUS PAVERS • CONCRETE SPREADERS, FINISHERS • COMPRESSORS • PUMPS

● Side-Dump Trailers

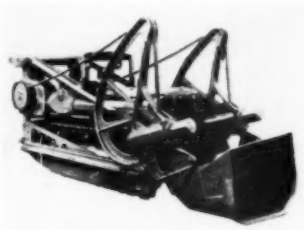
An increase of 12 percent in water level capacity of the new line of Easton side-dump trailers has been accomplished without increasing the overall dimensions of the trailer. The new all-welded body design features stronger edge construction, box section reinforcements, oak floor cushion, and optional replaceable side liners.

The bodies are reversible and may be dumped to either side. Three sizes are being made in 14-, 17-, and 20-ton capacities. They are products of the Easton Car and Construction Company, Easton, Pa.

● Shovel Loader

A rocker shovel with ⅜-cu. yd. rock or ¾-cu. yd. dirt capacity is the "Model 102" made by the Eimco Corporation, Salt Lake City 8, Utah.

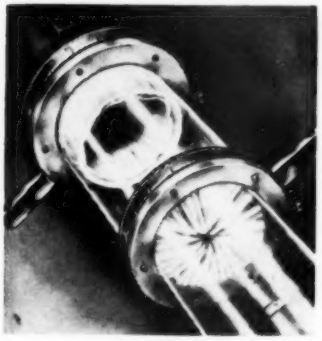
The 102 is designed for surface or underground use and can be obtained with diesel or electric power. Like other Eimco shovels, the new model loads at the front, rolls the load over the top on rocker arms and discharges at the rear. Only 8½ ft. of headroom is needed. Traction is supplied by crawlers. The machine can load at the rate of 4 or 5 buckets a minute, as no turning is required to discharge the bucket.



● Flow Control Valve

A flow control valve that operates on the same principle as the iris diaphragm on a camera is now being made by the Syntron Company, 385 Carson street, Homer City, Pa.

The diaphragm is flexible and made of nylon, duck, rubber or other material as necessary. No moving metal parts are exposed to the material; so the possibility of clogging and jamming is reduced. Control of the opening is obtained by simply rotating a lever on the valve.

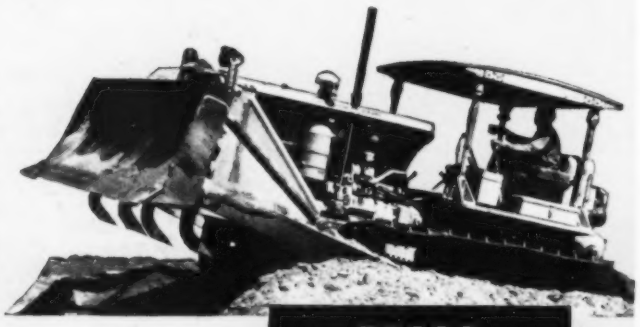


The valve is designed for use on hoppers, bins, and other places handling bulk materials and on air supply lines. There are five sizes to fit openings up to 12 in. in diameter.

● Vacuum Cleaner

An air-operated vacuum cleaner designed for portable use is being made by the Syntron Company, Homer City, Pa. The unit operates from compressed air and is entirely self contained in the 5- by 18-in. aluminum body. Small size and light weight make it easily available around machinery and for bins, containers, ceilings, and other hard-to-reach spots. There are no moving parts and no electricity; so the cleaner can be used with safety in explosive atmos-

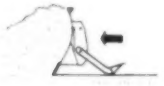
NEW METHOD...CHEAPER BULLDOZING



HINGED TEETH FOR BULLDOZERS WHICH RIP WHEN BACKING UP

PRECO *Back-Rip* SCARIFIERS

The 4 shanks, capped with lock-on teeth, rip the ground when tractor is backing up. Blade acts as depth gauge.



When tractor moves forward, teeth drag on top of ground. No controls are required.

Each tooth can be independently pinned up out of way. This permits making side cuts, trenches, curb locations.

Preco Back-Rippers, mounted on the back side of straight blade bulldozers, rip the ground while the tractor is backing up—for the next forward blading operation. They prepare the soil for easier blading by ripping rocks, roots and hard ground. The tractor produces more work with less horsepower—moving loose ripped material to the full capacity of the blade.

Preco Back-Rippers have been in use for the past three years by many well-known contracting firms. They save time and have replaced other equipment in building pioneer roads, clearing land and rights-of-way, in gravel pit operations, slate breaking in coal strip mines, mounted on pusher tractors for scraper loading, for logging operations and many other uses. Quickly installed on most straight blade bulldozers.

See your "Caterpillar" dealer or write us for information.

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INCORPORATED
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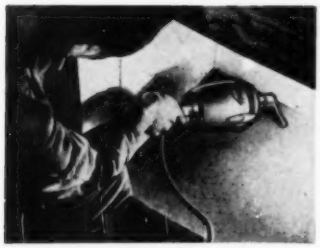
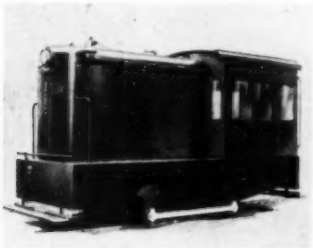


pheres. Air pressure of 75 lb. or more is all that is needed for operation. Air consumption is rated at 4½ c.f.m. at 100 lb.

● Diesel Locomotive

Diesel-powered locomotives with torque converter drives are being introduced by the Davenport Locomotive Division, Davenport Besler Corporation, 2305 Rockingham Road, Davenport, Ia.

The new series of hydraulic-drive locomotives are diesel-engine-equipped, with power supplied through an Allison torque converter. Gasoline engines can be supplied. Various sizes and gauges are obtainable to meet the needs of individual operating conditions.



The torque converter power is said to give smooth, quiet transition from one speed to another without slowing down.

● Scoop Accessory

A "Power Bucket" scoop accessory is available on new model Hi-Duty lift trucks manufactured by the Transitier Truck Company, Portland, Ore.

The scoop is designed for handling all bulk materials and has flared sides for cleaning up in tight situations. The bucket holds ⅓ cu. yd. and is dumped by hydraulic cylinders, so that full control is possible. The bucket will clear the side of a dump truck when used on a 9-ft. mast.

trade notes

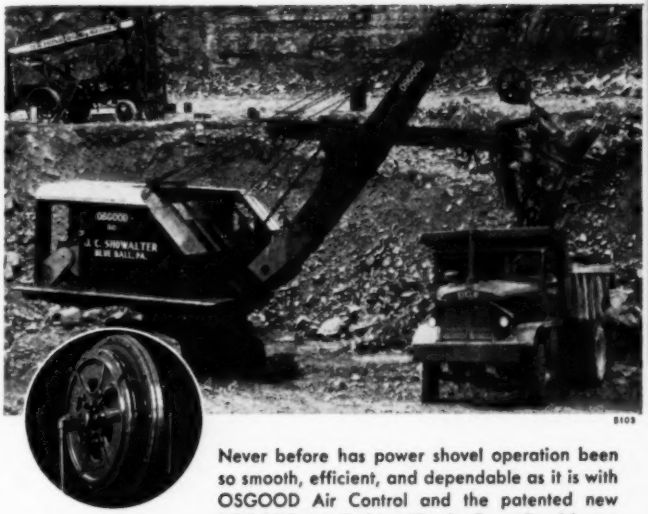
Robert E. Ferry has recently been appointed manager of apparatus sales offices in Wheeling and Fairmont, W. Va., for Westinghouse Electric Corporation.

Richard S. Walsh has been appointed manager of the Induction Motor Sales Division of General Electric's Small and Medium Motor Divisions at Schenectady.

OSGOOD

Air Control with Air Cushion Clutch

opens great new era in shovel performance



B109

Never before has power shovel operation been so smooth, efficient, and dependable as it is with OSGOOD Air Control and the patented new OSGOOD Air Cushion Clutch. Centralized levers with air metering valves permit *infinitely variable pressure* in activating all motions. And the amazingly simple OSGOOD Air Cushion Clutch completely eliminates jerking and grabbing . . . provides instant, accurate control of loads at all times . . . automatically compensates for gradual wear on clutch linings. Results: More production, less wear on men and machines, greater profits. Write for Bulletin.

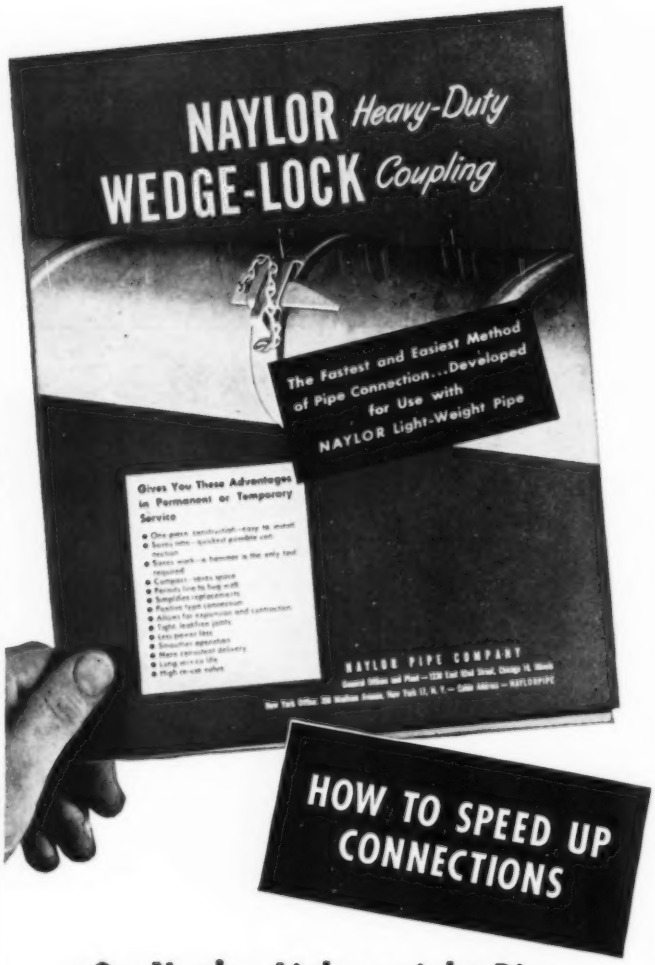
EQUIPMENT DESIGNED WITH YOUR JOB IN MIND

The OSGOOD COMPANY

MARION, OHIO

AFFILIATED WITH THE GENERAL EXCAVATOR CO.

POWER SHOVELS, CRANES
DRAGLINES, CLAMSHELLS
PILE DRIVERS & BACK HOES
CRAWLERS & MOBILCRANES
DIESEL, GASOLINE OR
ELECTRIC POWERED
CAPACITIES ⅛ TO 2½ CU. YD.


NAYLOR Heavy-Duty
WEDGE-LOCK Coupling
The Fastest and Easiest Method of Pipe Connection...Developed for Use with NAYLOR Light-Weight Pipe
Gives You These Advantages in Permanent or Temporary Service
NAYLOR PIPE COMPANY
HOW TO SPEED UP CONNECTIONS

...On Naylor Light-weight Pipe In Heavy-duty Service

This new bulletin, No. 513, presents complete facts on Naylor's Heavy-Duty Wedge-Lock Coupling—the fastest and easiest method of pipe connection yet devised for light-weight pipe from 8" to 30" in diameter. Write for your copy today, without obligation.

NAYLOR PIPE

Naylor Pipe Company, 1257 E. 92nd St., Chicago 19, Ill.
New York Office, 350 Madison Avenue, New York 17, N.Y.

The White Motor Company, Cleveland, Ohio, has acquired the business of the Sterling Motor Truck Company, Milwaukee, Wis. The latter now becomes the Sterling Division of the White Motor Company.

J. H. Fulford was elected president of the Jeffrey Manufacturing Company at the annual meeting of the firm's board of directors. R. H. Jeffrey, son of the founder and chairman of the board, was named chairman of the executive committee. R. W. Gillispie, president for the last 21 years, was elected chairman of the board to succeed Mr. Jeffrey.

Other officers promoted were the following: C. J. Leifeld, assistant to the president, to executive vice-president; J. E. M. Wilson, district manager, Pittsburgh, Pa., to vice-president and manager of the Mining Division.

W. M. Powell

William M. Powell, president of the Diamond Manufacturing Company, Wyoming, Pa., died on May 14, 1951, after a heart attack. He was also president of the National Association of Perforated Metal Manufacturers, secretary-treasurer of the Power Engineering Co. of Wilkes-Barre, and president of the Luzerne County Branch of the Pennsylvania Manufacturers Association.

A veteran of World War I and a leader in many community activities, Mr. Powell was especially active and successful in promoting good relations between employees and employers throughout the Wilkes-Barre industrial area.

Two executives of the John A. Roebling's Sons Company, Trenton, N. J., were killed and a third was injured in the Pennsylvania Railroad wreck at Bryn Mawr, Pa., on May 18.

The three men were returning from a convention in Cleveland when their stalled train was rammed by the Red Arrow Express. The victims who were fatally injured were Vincent L. Dalton, Philadelphia district sales manager, and George B. Stoess, assistant sales manager, Wire Rope Division. Albert Neroni, advertising manager, incurred facial injuries that necessitated hospitalization for several weeks.

The following changes in Hyster Company Eastern Division industrial truck and tractor equipment personnel have been announced. J. W. Morgan, for the last two years assistant sales manager, Eastern Tractor Equipment Division, Peoria, Ill., has been transferred to the Industrial Truck Sales Division and will be manager of the North Central district with headquarters in Buffalo, N. Y.

Donald R. Shaffer, North Central district manager, succeeds John E. Mitchell as Northeast district manager.

Melvin Ovestrud was elected president of Pioneer Engineering Works, Inc., Minneapolis, Minn., at the recent meeting of the board of directors. Mr. Ovestrud, formerly first vice-president, succeeds Lewis W. Yerk, whose voluntary retirement as president and general manager was announced. Mr. Yerk will continue active in the business as a member of the board of directors, as a member of the executive committee and as management consultant.

Eugene C. Bauer, president of Poor & Company, Chicago, Ill., was elected chairman of the board of directors.

The stock of Pioneer Engineering Works was acquired by Poor & Company, Chicago, Ill., in May, 1950. Although now a subsidiary of the Chicago firm, Pioneer Engineering Works continues to operate under its former corporate structure.

The first Marshall Plan guaranty contract, covering a European firm's royalty payments for an American company's manufacturing processes and other technical know-how, has been signed with the Gardner-Denver Company, of Quincy, Ill., the Economic Cooperative Administration announced recently. It is also the first Marshall Plan industrial guaranty granted for an investment in the Federal Republic of Germany, according to the ECA report.

Gardner-Denver manufactures mine car loaders, rock drills, compressors, other pneumatic equipment, and pumps. The German firm involved is Maschinen Fabrik A. Beien, now manufacturing chain conveyors and pneumatic backfill machines.

Under the licensing arrangement between Gardner-Denver and Beien, the German firm will manufacture and sell Gardner-Denver mine car loaders for use in German and other Western European coal mines.

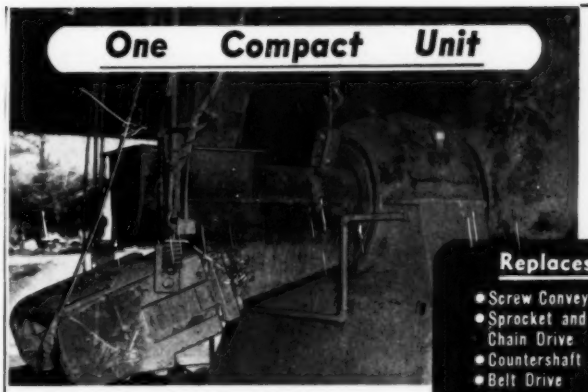
W. Forman Bickel has resigned as treasurer of Harbison-Walker Refractories Company after having served in this capacity for 24 years. Mr. Bickel became associated with the company in 1917 and was elected treasurer in 1927 and a director in 1931. With a total service to the company of 34 years, he will continue to serve as a director.

Lawrence E. Mock was elected treasurer to succeed Mr. Bickel.

The election of Edwin B. McConville as executive vice-president of Skilsaw, Inc., Chicago, Ill., was announced today by Bolton Sullivan, president, who also reported the election of Paul Watts as vice-president in charge of sales and Ralph B. Brundrett as treasurer of the company.

W. J. Roberts Sr. was re-elected president of the Traylor Engineering and Manufacturing Company, Allentown, Pa., for the 34th time at the recent annual meeting of stockholders and directors. Mr. Roberts has been associated with the company since 1907 and has served as president since 1918.

One Compact Unit



Replaces
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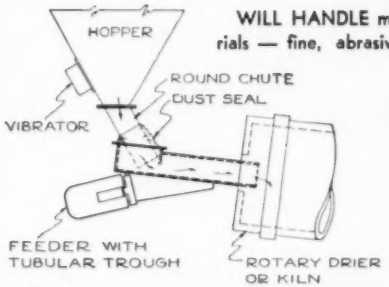
- Sprocket and Chain Drive
- Countershaft
- Belt Drive
- Motor

Syntron F-44 Tubular Feeder, regulating feed to a ball mill in a cement plant. Not only reduced maintenance cost by eliminating items noted, but greatly increased overall efficiency of the operation.

SYNTRON

"Vibra - Flow"

VIBRATORY FEEDERS



WILL HANDLE most all types of bulk materials — fine, abrasive, lumpy, hot, cold, dry, damp. AT variably controlled rates from pounds to hundreds of tons per hour. TO mixers, belt conveyors, ovens, driers, crushers, screens, driers, blenders, packaging machines, etc.

Due to absence of motors, pulleys, gears, cams, eccentrics and other wearing parts, Syntron Feeders operate with an exceptionally low maintenance cost.

Available in a wide range of sizes and styles: flat pan trough, tubular trough, half round trough, V-shaped trough, spreader feeders, drier feeders, oven feeders, picking tables, elevator feeders, screening feeders, grizzly feeders, and a host of other special types.

Our Engineering Dept. will gladly submit recommendations for the solution to your feeding problems. Please include all pertinent data, such as material to be fed, percentage of moisture, approx. tonnage requirements per hour, etc.

Catalog data is available on request

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ELECTRIC VIBRATORS
WEIGH FEEDERS
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TEST SIEVE SHAKERS
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SYNTRON COMPANY

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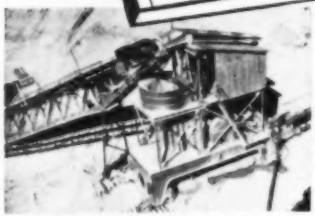
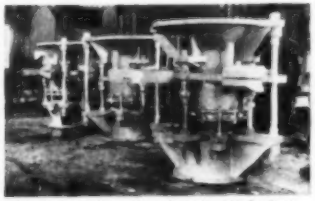
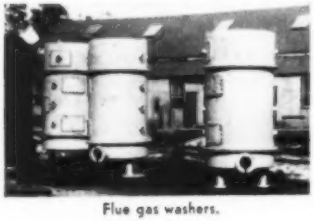
MADE-TO-ORDER EQUIPMENT try YUBA



Rail mounted crusher and pendulum conveyor.



Made-to-order valves for chemical plant.



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Harbor and river barge.

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T. G. Robinson

T. G. Robinson has been elected chairman of the Gas, Fuels, and Combustion Section of the Western Society of Engineers. Mr. Robinson is President of Meters and Controls, Inc., representatives of The Hays Corporation in the Chicago area.

Mr. Robinson has had plant operating experience with Commonwealth Edison Company and Western Electric and eight years with Sargent and Lundy, engineers in the layout and design of power plant instrumentation and automatic combustion control design.

Changes involving personnel of the Cummins Factory Service Organization are announced by L. W. Beck, vice-president in charge of sales of Cummins Engine Company, Inc., at Columbus, Ind.

Charles C. Sons, has been appointed acting eastern service manager, with headquarters in Columbus.

Dillard B. Davis, formerly eastern service manager, now is regional service representative in the Central Region, with headquarters in Chicago. Mr. Davis replaces Lloyd Kerber, who recently resigned to accept the position of general service manager for Cummins Diesel Sales Corporation of Missouri at St. Louis.

E. R. Gay

Announcement has been made of the appointment of Edward R. Gay as executive vice-president of St. Regis Paper Company. Mr. Gay formerly headed the kraft and multiwall bag operations of the company, as well as manufacturing in the printing paper division.

The board of directors also announced the following executive appointments: W. R. Adams, a vice-president, was placed in charge of all pulp and paper manufacturing. T. H. Cosford, a director in charge of Canadian operations, was named a vice-president. Five others were named vice-presidents, as follows: R. P. Bushman, vice-president in charge of filling machines. J. B. Eakin, vice-president in charge of purchasing. Albert Ernest, vice-president in charge of Southern timberlands and pulpwood. Willard Hahn, vice-president in charge of multiwall bag manufacturing. C. H. Hartman, vice-president in charge of multiwall bag development. In addition, Gurdon W. Wattles was named to the executive committee to fill the vacancy created by the death of James H. Allen.

Appointment of G. E. Campbell as assistant works manager and of Donald A. Sutherland as industrial sales manager has been announced by the Pesco Products Division of Borg-Warner Corp., Bedford, Ohio.

E. J. Foltz, previously Mr. Sutherland's assistant, has been promoted to the post of industrial relations manager.

A. F. Reinking, formerly assistant sales manager, has been named manager of the Steam Turbine Sales Division of Worthington Pump and Machinery Corporation. Mr. Reinking will make his headquarters at Worthington's Wellsville, N. Y., plant.

Arthur B. Kinley and Wayne L. Smith have been named general machinery division sales representatives in Allis-Chalmers district offices in the West.

Mr. Kinley has been assigned to the Spokane office, where he will specialize in selling equipment for the cement, mining, and rock products industries. Mr. Smith, an electrical engineer, is now with the Denver district office.

The Bemis Paper Bag Co., with plants at Vancouver, Wash., and Wilmington, Calif., a wholly owned subsidiary of the Bemis Bro. Bag Co., became a part of the parent company on May 1, 1951.

Elliott D. Harrington, recently appointed vice-chairman and secretary of the Defense Projects and priorities Committee of General Electric's Small and Medium Motor Divisions at Schenectady, N. Y., died suddenly on April 1 of a heart attack. He was 54 years old.

Well known in the electrical industry, Mr. Harrington played a prominent role in G. E.'s work in the electric motor field and was a pioneer in the company's air conditioning and commercial refrigeration activity.

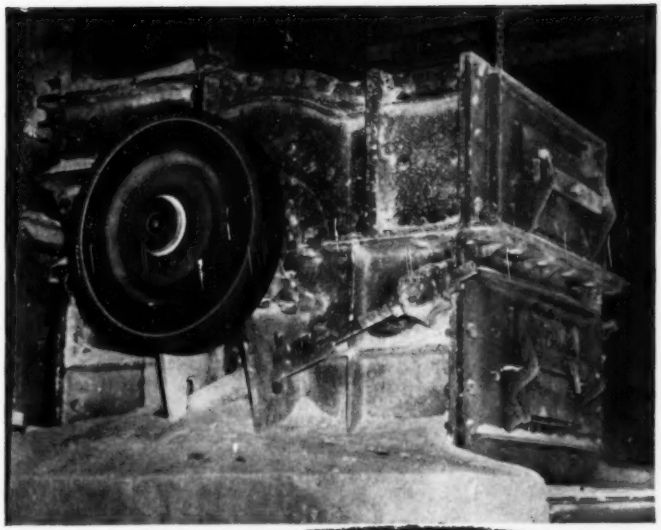
He was named to the defense committee post in January, having previously been manager of the Induction Motor Sales Division.

The Hays Corporation, Michigan City, Ind., announces the appointment of Jack J. Tipton to the position of chief project engineer. Mr. Tipton was formerly a project engineer primarily concerned with combustion control.

In his new position Mr. Tipton will oversee the acceptance and handling of orders for all Hays products including draft guages, gas analysis instruments, electronic equipment, and combustion control.

The Cleveland Vibrator Co., 2710 Clinton Ave., Cleveland, O., which has produced air vibration equipment for over 25 years, has recently completed another addition to its plant, the third expansion in five years. The new addition will house new automatic screw machines being used for vibrator production.

The company's shipping room has been streamlined, and a conveyor line has been installed down its center. Automatic spray painting facilities have been installed in a separate room.



1,150,000 TONS OF STONE CRUSHED WITH A PARTS-REPLACEMENT COST OF ONLY 1/3¢ PER TON

AMERICAN ACS-4 HAMMERMILL at Missouri Quarry gives proof of BUILT-IN QUALITY

At a large Missouri Quarry, this rugged American Hammermill keeps parts-replacement — and stone crushing costs — down to a minimum.

That's because Americans are built to last — with heat treated alloy steel main rotor shaft . . . heavy-duty Timken Bearings enclosed in dust and oil-tight pillow blocks . . . heavily ribbed sectional frame for vibration-free operation and easy accessibility and adjustability . . . all-manganese steel crushing parts for longer wear.

From agstone to roadstone sizing, Americans offer the flexibility and consistent sizing control that make every reduction job more efficient as well as more profitable.

SEND for your copy of "BETTER STONE CRUSHING".

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1059 Macklind Ave.
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New "Packaged Unit" designed for aggregates, coal, coke, ores and other bulk materials

Equally applicable for both small or large scale operations, the new Hewitt-Robins Sectional Belt Conveyor is a packaged unit that can be assembled by your own workmen—and in considerably less time than required for conventional type conveyors.

From the variety of truss sections, head sections and A-frame supports you can select a conveyor system suited to your needs—in length, height, belt width and capacity. And, when you change locations, the conveyor can be disassembled, with sections added or dropped to suit conditions at the new site.

Like all Hewitt-Robins machinery, this new Sectional Belt Conveyor is carefully designed, strongly constructed. It is equipped with world-famous Robins Troughing and Return Idlers with one-shot lubrication. Curved decking protects the return strand of the belt.

And remember, only Hewitt-Robins is able to take single, unified responsibility for a successful Belt Conveyor installation—machinery and belting. For complete information on the new Hewitt-Robins Sectional Belt Conveyor, write today for Bulletin No. 132. Address Robins Conveyors Division, 270 Passaic Avenue, Passaic, N. J.

* * *

HEWITT-ROBINS SECTIONAL BELT CONVEYOR

HEAD SECTIONS—3 types of drives to take motors from 2 hp to over 40 hp. Terminal pulleys (both head and tail) are solid welded steel with cast iron hubs.

TRUSS SECTIONS—2 designs—24" deep in lengths of 6'6", 15'6", 18'6", and 21'6"; 42" deep for greater spans. Side members all-welded construction; diagonal bracing members have jig-drilled holes for quick field assembly.

BENT SUPPORTS—A-frames are available in complete range from 4' to 50' deep—easily erected.

BELT WIDTHS—18", 24", 30" and 36". Lengths up to belt limitation.

HEWITT-ROBINS

BELT CONVEYORS

HEWITT-ROBINS HR INCORPORATED

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS
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RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS
TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

Harvey W. Clements, manager of the Chicago General Sales Division of the Bemis Bro. Bag Co. since 1930, died on April 11 at Chicago, after an illness of about three weeks.

Mr. Clements joined Bemis in 1912 as a salesman in Chicago. He remained there during his entire career except for a brief period when he was attached to the New York office.

William Wellings Jr. was recently placed in charge of paper procurement of Arkell and Smiths, Canajoharie, N. Y. Mr. Wellings will maintain offices at 500 Fifth Avenue, New York City.

Ehret and Kinsey, Chicago sales representatives of the Cleveland Worm and Gear Company and The Farval Corporation, have moved to new quarters in the Board of Trade Building, 141 West Jackson Blvd.

A $30,000,000 addition to Du Pont's Experimental Station at Wilmington, Del., was dedicated recently before an assemblage of more than 200 scientists. The expanded station, beside historic Brandywine Creek, constitutes one of the largest research establishments in American industry, and will house about half of the company's research personnel. Thirty-six laboratories are maintained at 26 locations.

The expanded station contains a library of 25,000 volumes in all languages, and laboratory and service buildings. A total of 19 structures were added in the expansion, and others were enlarged. About 2,300 persons are engaged in the activities in the experiment station.

William S. Richardson, president, B. F. Goodrich Chemical Company Cleveland, Ohio, has been elected a vice-president of The B. F. Goodrich Company, it was announced by John L. Collyer, chairman of the board and president. Mr. Richardson will continue as president of the chemical company, a division of The B. F. Goodrich Company.

The appointment of W. T. Billard, Inc., 734 East 3rd St., Los Angeles, as Southern California distributor for Transitier Truck Company, Portland, Ore., has been announced.

W. T. Billard, Inc., is one of the largest distributors of materials handling equipment in California. The firm will carry parts and offer full sales and service facilities for the Hi Duty line of gas-powered, pneumatic-tired fork lift trucks.

Norman A. Strang has been appointed advertising manager of SKF Industries, Inc., Philadelphia, Pa. He succeeds Robert C. Byler, who died recently.

Laurence R. Keltner has been named director of employee relations of the B. F. Goodrich Company, reporting to J. W. Keener, vice-president. Mr. Keltner assumes his new duties in Akron on June 1. He has been manager of the B. F. Goodrich tire plant in Los Angeles since 1947.

The following appointments were announced by the GMC Truck and Coach Division at Pontiac, Mich.: Loren T. Flynn, formerly manager of transportation engineering, appointed manager of government sales, Truck Division; T. L. Harris, formerly a member of the GMC truck sales administration group, appointed manager of distribution, Truck Division; George R. Oliver, formerly manager of distribution, transferred to the Government Sales Section of General Motors Corporation.

F. C. Sonneman

Announcement of the promotion of E. C. Sonneman to assistant export divisional manager was made recently by the Caterpillar Tractor Co., Peoria, Ill.

Mr. Sonneman's new position will be that of assistant manager of the Latin American division, which includes the countries of Central and South America.

Herbert F. Gunnison, Anchorage, Ky., has been appointed sales representative in the Louisville area by Signode Steel Strapping Co., Chicago, Ill. His new territory will include Louisville, most of Kentucky, and a part of southern Indiana.

Stanley F. Krzeszewski was elected a vice-president of American Wheelabrator and Equipment Corp., 500 South Byrkit Street, Mishawaka, Ind. He has been factory manager, and will continue with these duties.

E. C. Buehrer Associates, Inc., 527 Folsom St., San Francisco, Calif., has been appointed bay area distributor for the Hi Duty lift truck, manufactured by Transitier Truck Company, Portland, Ore.

E. C. Buehrer Associates will also offer parts and service facilities for the complete Hi Duty line.

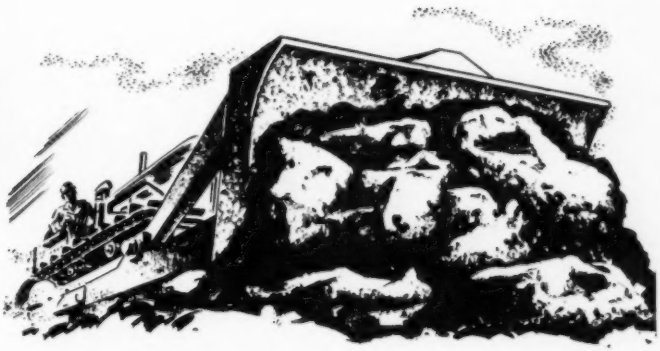
The F. D. Cummer & Son Company has moved to larger offices at 1827 E. 18th Street, Cleveland 14, Ohio. Additional space has also been provided for parts warehousing. As part of the expansion the following assignments were announced; R. N. Birdsall, chief engineer; J. F. Volney, progress engineer and purchasing agent; E. L. Flasche, structural engineer; and J. R. Black, assistant to the vice-president.

J. S. Roscoe has been appointed director of purchasing by the Lincoln Electric Company, Cleveland, Ohio. Mr. Roscoe has been district manager in Syracuse, Pittsburgh, and Chicago. He has been a leader in the development of automatic welding in numerous applications and has written many technical articles on welding.

SPECIFIED FOR THE JOB!

J-M INDUSTRIAL FRICTION MATERIALS

are designed to take a beating—that's why they're specified by manufacturers who build earth-moving equipment that lasts!



SPECIFIED ON THE JOB!

Men who operate bulldozers—cats—shovels—know they can get the tough jobs done when they're running machines equipped with J-M INDUSTRIAL FRICTION MATERIALS

• Digging a canal—stripping a mine—cutting a road—Johns-Manville Friction Materials move more tons of earth than any other industrial brake or clutch frictions. That's because they've built a reputation for handling bigger loads at high speeds—*at lower cost!* Send for your copy of "Johns-Manville Industrial Friction Materials" that tells how these materials combine maximum operational efficiency with long life and low-cost maintenance. Write Johns-Manville, New York 16, N. Y.

JM

Johns-Manville

INDUSTRIAL FRICTION MATERIALS

No. 1 With Leading Manufacturers

The General Electric Company has taken an option to lease manufacturing space in Ludlow, Vt., as a part of its currently expanded jet-engine production program.

The Hays Corporation announces the appointment of John R. Heming to the position of project engineer in charge of combustion control.

In this position Mr. Heming will be in charge of obtaining all engineering data needed to complete control orders; in addition he will handle the entering of these orders. Typical of the products under his supervision are draft, pressure, and fuel-air ratio controllers, complete combustion control systems and Veritrol and Veriflow meters.

The sale of its industrial scale business to Detecto Scales, Inc., Brooklyn, N. Y., was announced by the Yale & Towne Manufacturing Company. Effective June 1, 1951, the transaction will involve scale patents, equipment, parts, and inventory, but none of the Yale trade marks, except "KRON".

The space, machine hours, and manpower released by the sale of the scale business will be used to relieve the pressure of the defense requirements for Yale industrial trucks and hoists.

At a meeting of the stockholders of Automatic Steel Products, Inc., Canton, O., Ralph Henderson Everett was elected a director. Mr. Everett was associated with Keystone Varnish Company, Brooklyn, N. Y., from 1916 to 1943, serving as secretary from 1923 to 1943. More recently he has been with M. J. Merkin Paint Company, New York City and Lyndhurst, N. J., as executive vice-president.

Three new directors were elected to the Board of Diamond Iron Works, Inc., and Mahr Manufacturing Company Division at the annual meeting recently.

Newly elected directors are James H. Binger, general manager of the Valve Division, Minneapolis-Honeywell Regulator Company; Melvin J. Carlson, retired, former vice-president, Stewart Paint Manufacturing Company; and George E. Ericksen, treasurer, C. J. Hoigaard Awning Company.

Past directors re-elected include James P. Blaul, A. H. Daggett, W. C. MacFarlane, H. C. Piper, L. J. Reay, and H. E. Wood.

Ralph W. Rausch has been appointed consulting engineer of Link-Belt Company, Chicago, Ill. His headquarters will continue to be at the Pershing Road plant, Chicago, of which he has been chief engineer.

Joseph J. Richard, heretofore executive assistant chief engineer of the Pershing Road plant, has been appointed chief engineer of this plant to succeed Mr. Rausch.

William H. Shank has been named public relations supervisor of the Hardinge organization, in addition to his present duties as advertising manager.

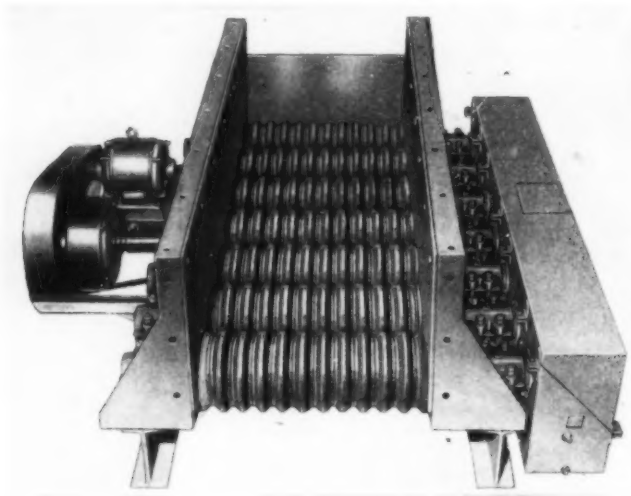
In his new capacity, Mr. Shank will be responsible for dissemination of information concerning company public relation policies to the press and through various publications. He will also represent the company in connection with industry and community relations activities.

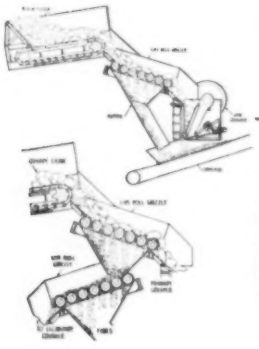
Franklin W. Olin, 91, dean of the nation's sporting arms and ammunition industry, died on May 21 at a hospital in St. Louis, Mo. Companies that he founded grew into the modern-day Olin Industries, Inc., with headquarters at East Alton, Ill.

Mr. Olin, whose industrial enterprises grew from a small black powder plant established in 1892 at East Alton, was credited with improving not only sporting arms and ammunition, but also materials for United States armed forces in two major wars.

G. M. Robb has been appointed manager of the Bemis Bro. Bag Company's textile bag and multiwall paper bag manufacturing plants at Houston, Tex. Mr. Robb succeeds F. V. Deaderick, who recently assumed the newly-created post of Eastern director of sales, with headquarters in New York.

Mr. Robb's successor as sales manager of the Houston Sales Division is C. J. Hurster, who was a salesman in the Houston territory. L. W. Chenault has been appointed as assistant to Mr. Robb in managing Bemis' two Houston plants.





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LIVE ROLL GRIZZLY

This non-clogging, low-angle grizzly reduces surges and smooths flow of all types of material. An excellent scalping device . . . far more economical to operate than a scalping screen. Low maintenance . . . install it and forget it . . . drives are sealed in a bath of oil for positive lubrication.

For detailed information, write:

ROGERS IRON WORKS CO.

JOPLIN, MISSOURI

R. G. LeTourneau, Inc., Peoria, Ill., has started construction of its own steel mill at its plant at Longview, Tex., according to announcement made by the company. An approved Certificate of Necessity for construction has been granted LeTourneau by the National Production Authority.

The mill, whose foundation already has been poured, is expected to be in operation by the end of this year, and will be capable of turning out 1,000 tons per day of finished steel plate 144 in. wide, ranging in thickness from 3/16 in. to 12 in.

Steel produced by this mill will be used to meet the company's needs in its U.S. plants. The initial investment in constructing the mill will amount to nearly a million dollars.

Stuart E. Kay and F. H. Savage were recently elected vice-presidents of the International Paper Company of New York, N. Y. Mr. Kay has been manager of manufacturing at Northern Mills since 1936, and Mr. Savage is assistant general sales manager.

One hundred sixty-six employees of the Independent Pneumatic Tool Co., Aurora, Ill., manufacturers of Thor portable power tools, were initiated into the company's new 25 and 50-Year Clubs on May 14.

One hundred forty men and women employed in the company's main works at Aurora attended the inaugural dinner. Also honored, but not present at the event, were members from various Thor branches across the country.

Thomas Robins Jr., president of Hewitt-Robins Inc., and president of the newly-activated Kentucky Synthetic Rubber Corporation, Louisville, Ky., has been elected a director of the Rubber Manufacturers Association. Four other directors were re-elected for three-year terms to the association's 15-member board. A member of the Hewitt-Robins organization for 32 years, he has been president for 16 years.

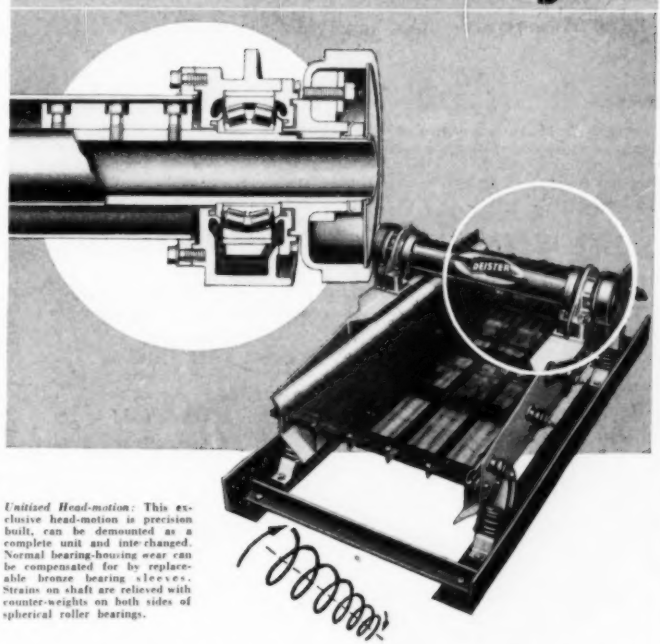
The Kentucky Synthetic Rubber Corporation is presently being operated under contract with the Reconstruction Finance Corporation by ten rubber companies outside of the tire division of the rubber industry. Kentucky Synthetic was the second such rubber plant to be called back into service after the Korean crisis.

The appointment of Thomas R. Lawson as assistant sales manager of industrial products for the Westinghouse Electric Corporation, Pittsburgh, Pa., was announced recently.

Mr. Lawson's duties will include responsibility for coordination of industrial products, defense planning, and new product planning from the commercial standpoint. He will work with division sales and application data and training departments on negotiation procedures and other matters.

The Chicago office of the Ludlow-Saylor Wire Company has been moved to 6 N. Hamlin Avenue, Chicago 24, Ill.

Screens Any Ag-Lime without blinding



Unitized Head-motion: This exclusive head-motion is precision built, can be demounted as a complete unit and interchanged. Normal bearing-housing wear can be compensated for by replaceable bronze bearing sleeves. Strains on shaft are relieved with counter-weights on both sides of spherical roller bearings.

Properly install this Deister Ag-Lime Screen and you can be sure of *high* capacity in handling *any* ag-lime, *no matter how damp or sticky it may be.*

Not once, since it was introduced two years ago, has this screen failed to perform satisfactorily *without blinding.*

And here are the three *proved* reasons why:

1. ***Longer stroke:*** **The special construction features permit a longer stroke at higher speed than found on any other screen.**
2. ***Far higher speed:*** **This screen operates at up to 2,000 rpm . . . that's 2,000 complete cycles per minute.**
3. ***Graduated length of stroke:*** **The exclusive head-motion also amplifies the stroke more at the feed end where material is deeper, with a lesser stroke at the discharge end where accuracy is your goal.**

All of these things are possible because of the new, unitized head-motion and the super-strong but light weight aerodynamic type of construction.

Plus: **In addition to these features, you also obtain the well-proved Deister screen-cloth tension features which eliminate whipping . . . the special springs which isolate all vibration from supporting structure . . . adjustable throw, simply made in a few minutes . . . and interchangeable flywheels so you can place the drive on either side.**

For high capacity without blinding on any Ag-Lime, specify a Deister Ag-Lime Screen. Write for Bulletin No. 51 today.

DEISTER SCREENS

DEISTER MACHINE COMPANY

FORT WAYNE 4, INDIANA

• First TD 24 hydraulic dozers built by Pullman-Standard Car Manufacturing Company since the acquisition of the Isaacson road equipment division in January, 1951, are shown above being shipped from the Hammond, Ind., plant of the company. Tractors are shipped from International Harvester's nearby Melrose Park, Ill., plant to Hammond, which allows Pullman-Standard to attach its road equipment and ship the complete unit to customers.

For Top Flight Gas Welding

Choose from AIRCO'S complete line of

Oxyacetylene Welding Supplies

Time Proved . . . Job Tested . . . Money Saving

Available from Local Stocks

That's right! Whether you use a popular Airco gas welding rod, flux, or brazing alloy for production or maintenance operations . . . you're certain of top-notch work—ask any one of the thousands of welders who swear by these Airco oxyacetylene welding supplies.

This well-recognized reputation for top performance didn't just happen—more than thirty years' experience and development have gone into the manufacture of these outstanding gas welding supplies . . . know-how that produces high quality, reasonably-priced items that guarantee a job done faster, done better, done easier and done at less net cost.

For further information about Airco's oxyacetylene welding supplies which includes a complete line of rods, fluxes and brazing alloys, write your nearest Airco office or Authorized Dealer for a free copy of Catalog 12.

AIRCO **AIR REDUCTION**

AIR REDUCTION SALES COMPANY • AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

Officials of the Thew Shovel Co., Lorain, O., announces the appointment of the Dalrymple Equipment Co. of Memphis as distributors of Lorain power shovels and cranes. Their territory includes western Tennessee; Mississippi, north of and including the counties of Coahoma, Quitman, Panola, Lafayette, Pontotoc, Lee and Itawamba; and Cross, Mississippi, Crittendon, St. Francis, Lee, and Phillips counties in Arkansas.

O'Neil Equipment Co., Muskegon Heights, Mich., has been appointed Lorain distributor. Both distributors will sell and service the complete line of Lorain power shovels, cranes, draglines, clamshells and hoes.

Link-Belt Company announces that construction has started on a modern engineering and manufacturing plant for the production of elevating, conveying, and processing machinery, on a 43-acre site at Colmar, Pa., on the Doylestown branch of the Reading Railway.

The new plant is designed for efficient straight-line manufacture from the receiving department at one end of an 880-ft. long building to the shipping department at the other end. It will contain approximately 300,000 sq. ft. of floor space, including a two-story office building and a modern cafeteria. The layout allows for future expansion to double the initial size.

Joseph G. Surmacz has been named to the position of chief industrial engineer of Harnischfeger Corporation, Milwaukee, Wis. In this position Mr. Surmacz will be in charge of production control.

David A. Drewery has been appointed plant industrial engineer. He will supervise work methods, time study, job evaluation, and cost analysis.

Flexible Tubing Corporation, Guilford, Conn., makers of Spiratube, Flexflyte, Ayrtube, and other special problem ducts for industry, has announced the opening of a new division for the manufacture of defense products, the Inflatables Products Division. It will concentrate upon the manufacture of sleeping pads, life vests, life rafts, and products of a similar nature. The division will be headed by Frederic Rosenthal.

A. W. Hamrick, a senior field engineer for Signode Steel Strapping Co., has resigned his position to take an appointment with the National Production Authority in Washington, D. C. His duties will pertain to the distribution of steel to manufacturers of steel strapping and accessories, and the equitable distribution of steel strapping for packaging and transportation of defense materials by private industry.

Construction Equipment Company, Spokane, Wash., has been named a distributor for Kue-Ken jaw and gyratory crushers, made by the Straub Manufacturing Company, Oakland, Calif. The distributor's territory will be eastern Washington.

B. R. McClure has been appointed assistant to the manager of sales of the General Electric Company's Fractional Horsepower Motor Divisions at Fort Wayne, Ind.

Concurrently, D. C. Hanson has been made manager of the Refrigeration Equipment Sales Division and K. R. Whearley has been placed in charge of the Distribution, Parts, and Service Sales Section, it was announced.

B. T. Eagerton

B. T. Eagerton, vice-president, Export Division, Nordberg Manufacturing Company, has been elected charter president of the Milwaukee Trade Club, Inc.

Mr. Eagerton is also vice-chairman of the Foreign Commerce Commission of the Milwaukee Chamber of Commerce. He has been in charge of the Export Sales Division of Nordberg Manufacturing Company since 1946 and recently returned to Milwaukee from an extensive trip through Mexico and Central and South America.

Milwaukee Trade Club, Inc. was formed through the amalgamation of two former Milwaukee export associations. Mr. Eagerton had been an active member in both organizations.

Formation of a wholly-owned subsidiary, the Canadian Westinghouse Supply Company, to distribute products of the Canadian Westinghouse Company, Ltd., has been announced by Herbert H. Rogge, president.

At the same time, Mr. Rogge announced the election of Roy L. Brown as executive vice-president and general manager of the new firm. Mr. Brown formerly was Eastern District manager of the Westinghouse Electric Supply Company in New York.

In addition to Westinghouse merchandise, the Supply Company will sell under contract other lines such as cable, conduit, and fittings not manufactured by Canadian Westinghouse. In this way, builders, contractors, and small and medium businesses will be able to purchase complete lines at one location.

President Aleman of Mexico, accompanied by several ministers and other government dignitaries, attended the opening of a new vertical turbine pump plant of Worthington Pump and Machinery Corporation in Mexico City on May 14.

Worthington was represented by Clarence E. Searle, vice-chairman of the board of directors, and Marte Gomez, president of Worthington de Mexico, S. A. Luncheon and a plant tour were a part of the opening ceremonies. Worthington's construction of a 50,000-sq. ft. plant in Mexico City came after the company was awarded several Mexican government contracts for vertical turbine pumps to be used for irrigation projects.

Westinghouse Electric Corporation's new plant now under construction in Union City, Ind., will be geared to produce 75,000 electric motors a month.

Ralph E. Davis, Westinghouse executive who will manage the new plant, told a dinner meeting of civic and business leaders that production is expected to get under way in December of this year. The plant will build small electric motors ranging from 1/20 to ½ hp.

Located on 35 acres of ground, the new plant will be 500 ft. long and will contain 140,000 sq. ft. of floor pace. It will not depend on any other location for vital parts, other than raw or processed materials. At full production, it will have more than 500 employees.

Dr. Louis T. Rader has been appointed assistant manager of engineering of the General Electric Company's Control Divisions at Schenectady, N. Y.

Dr. Rader has been with G.E. since graduating from the California Institute of Technology except for a period when he was with the Illinois Institute of Technology.

Coast Equipment Company, San Francisco, Cal., construction, industrial and mining machinery distributors, have been appointed exclusive sales and service representatives for the Eagle Iron Works, Des Moines, Ia., which manufactures sand, gravel and ore washing equipment; breaker balls, drop pile hammers, line weights; and the Eagle "Swintek" dredging ladder.

"A New Slant" on Modern LIME PLANT Operation

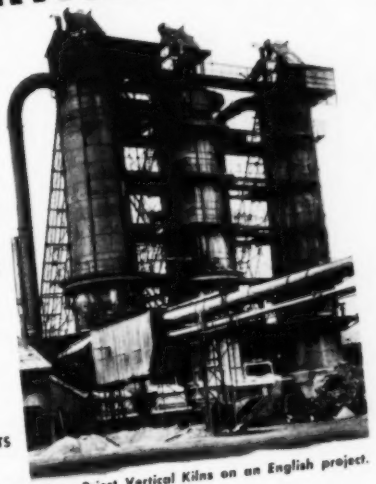
Priest VERTICAL KILN

Tested-and-proved in many installations abroad, economy-minded American operators are finding the Priest Vertical Kiln a "natural."

This British-designed Kiln is compact, fully mechanized, and has a patented water-cooled burner that insures uniform fuel distribution and large output.

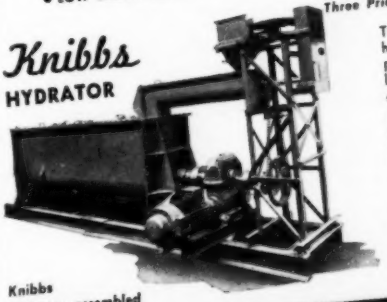
Special features of the Priest Kiln include:

- LOW FUEL COSTS
- SUPERIOR QUALITY LIME
- FLEXIBILITY
- LOW MAINTENANCE
- MINIMUM DOWN TIME
- AUTOMATIC CONTROL
- MODERATE POWER REQUIREMENTS
- LOW LABOR COSTS



Three Priest Vertical Kilns on an English project.

Knibbs HYDRATOR



Knibbs Hydrator assembled

The Knibbs Hydrator is a continuous hydrating machine that insures a pure and "sound" product, with full lime recovery. Hydrates both calcium and magnesium fines. Differentiates automatically between quick and slow slaking limes. Other advantages: Hydrate of high plasticity and reactivity—100% elimination of dust—compact and accessible—low upkeep and operating costs—flexible control—minimum noise.

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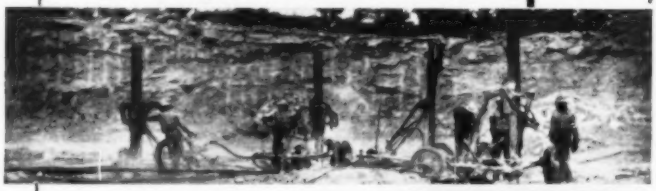
TORONTO, ONTARIO, CANADA

Quarrying costs cut at Buggs Island *with*



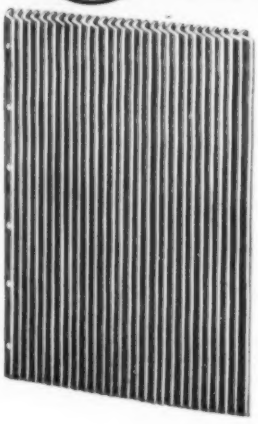
tungsten-carbide ROK-BITS

Tungsten-carbide Rok-Bits: 4-Point Cross Bit or 2-Point Chisel Bit—gauge sizes—1⅜ to 4".

Uniform drilling pattern was a cost-cutting factor in the quarrying operation at Buggs Island dam. To insure completed holes, at proper spacing, the drilling was done with tungsten-carbide Rok-Bits. Learn how they can cut your costs. Write! Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. *Branch:* 350 Depot St., Asheville, N. C. *Manufacturers of pneumatic tool accessories.*

ROCKBIT
SALES AND SERVICE CO.

Unit Type CLINKER COOLER GRATE
Saves Assembly Cost



A NEW IDEA IS BORN . . . fathered by a quarter-century of experience in the manufacture of alloy steel castings for cooling equipment.

This improved type of Clinker Cooler Grate is *different* . . . and definitely better . . . because it comes as a completely assembled unit, ready to drop in place without any expense for assembly work on the job. Its unique design permits a saving in weight, insures increased service life and reduced maintenance. Space for air inlets between bars is controlled by the size of small bosses on back of each bar. Bars are screwed up tight in close contact, and kept in place by two Pyrasteel rods, welded at the ends.

Our customers, including nationally known cement companies, have been using these Clinker Cooler Unit Grates with satisfaction and economy.

Write for details on special types of Alloy Steel Castings.

CHICAGO STEEL FOUNDRY COMPANY
Kedzie Avenue at 37th Street
Chicago 32, Illinois
Makers of Alloy Steel for Over 40 Years

Charles Glocke

Charles Glocke, field service manager, has been named service division manager of the Four Wheel Drive Auto Company, Clintonville, Wis.

Mr. Glocke has had wide experience in the automotive field as service manager and field service man. He also prepared service manuals and instruction films for the armed forces during the war. In 1945 he was named field service manager for Four Wheel Drive.

Succeeding Mr. Glocke as field service manager is Bruce V. Walch, former manager of the part sales department. Mr. Walch has been with F. W. D. since 1927.

Patrick Dolan

Patrick Dolan has been named district manager of the newly established Baltimore office of The Patterson Foundry & Machine Company, East Liverpool, O., according to announcement made by Richard L. Cawood, president. Mr. Dolan has been a sales engineer at the main offices for a number of years.

The Baltimore office will be located at 1605 Court Square Building.

William A. Horthy, research engineer at the International Harvester Company's Melrose Park plant, Ill., retired on his 65th birthday, April 6, after 41 years with the company.

Mr. Horthy was a graduate of Technical College, Budapest, Hungary. He started with International Harvester in 1910 as draftsman in the tractor works, and devoted most of his time to designing diesel engines that would burn cheaper-grade fuels more efficiently.

Sterling Electric Motors, Los Angeles, Calif., announces the following additions to its sales and engineering staff: J. F. Ingle, 1066 Howard Street, San Francisco, district manager, central and northern California and western Nevada; R. P. Killion, 1213 Capitol Avenue, Houston, district manager, southeastern Texas; H. L. Fritz, 1667 Argonne Drive, Baltimore, Md., territory; E. W. Hodge Jr., 1727 6th Avenue North, Birmingham, Ala., territory; J. P. Foley, C. E. O'Leary, and R. S. Portner, 385 Gerard Avenue, New York City district office; M. Maxham and J. Malloy, Los Angeles sales.

K-P *Engineered*

WIRE SCREENS

* **SIEVING**
* **SIZING**
* **SEPARATING**

Korb-Pettit Wire Screens are not only first quality in material and workmanship but are engineered for the job involved. Available in High Carbon Spring Steel and Oil Tempered Spring Steel for extreme abrasion resistance. Designed for all types of vibrators and rotary equipment.

Wire Screens,
Spiral Woven Wire
Conveyor Belts,
Special Purpose
Conveyors
designed & manufactured
Wire Partitions,
Machine and Window
Guards, Cages,
Enclosures, Grilles, etc.

KORB-PETTIT
WIRE FABRICS AND IRON WORKS
INCORPORATED
Engineers and Manufacturers
1503 No. Mascher St.
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ASK FOR HANDBOOK NO. 36

legal decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Recently the writer traveled 12 Southern states and conversed with many readers of PIT AND QUARRY, including officials and employees who are interested especially in taxation laws. Here are questions presented to the writer personally in various, but similar forms by readers: "What right has a state to tax property belonging to an individual, firm, or corporation whose principal place of business is located outside the state? Can a state tax motor trucks and other vehicles occasionally sent into a state from another state in which their owner has his principal place of business?"

Modern higher courts consistently hold that property, motor vehicles, cars, boats, and the like sent into a state by a nonresident, to be used or employed permanently there, must bear its fair share of the burden of taxation, although such property is only temporarily located within the taxing state.

For example, in *District of Columbia v. Smoot Sand and Gravel Corporation*, 184 Fed. (2d) 987, the testimony showed facts as follows: The Smoot Sand and Gravel Corporation owns tugs, scows, and launches used for the transportation of sand and gravel from deposits in Virginia and Maryland to storage places in the District of Columbia and thereafter to points of delivery in Maryland and Virginia. They come into the District from the places of deposit on an average of once a day but spend more time out of the District than in it. The scows were not licensed or enrolled anywhere. The other vessels were licensed and enrolled at the port of Alexandria, Va. No personal property tax is levied on this property in Delaware, but taxes are levied on the equipment in Virginia on the basis of an assessment of approximately 30 percent of its value.

It should be added that the Smoot

HELP OUR NAVY GET SUBMARINES!
YOU SAVE STEEL...
When You INCREASE the LIFE of YOUR EQUIPMENT with . . .
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SEACO
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Write TODAY for FREE Literature . . . Outlines Newest Methods of Economical Repairs.
NAME OF NEAREST DISTRIBUTOR UPON REQUEST
Hard-Surfacing
WELDING ELECTRODES
1. A SINGLE PASS of SEACO allows Hammermill Hammers, Crusher Mantles, Bucket Teeth and Bucket Lips to work-harden and last longer.
2. REPAIRS made with MANGANAL and protected with SEACO outlast new parts.
3. SEACO resists severe impact and abrasion . . . is never softened by dilution from parent metal.
4. AVAILABLE in 1/4" and 3/16" diameter, standard lengths, 12".
STULZ-SICKLES CO.
SOLE PRODUCERS
93 N. J. Railroad Ave.
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...Packs Plenty of *PUNCH!*

"Cape Ann"
FORGED
STEEL DROP BALL

- RUGGED DESIGN
- GREATER IMPACT
- ECONOMICAL

This is the "rock-buster" preferred by many leading quarry operators.

The "Cape Ann" Drop Ball has a forged connecting link, protected by a deep recess, adaptable for swivel or shackle. Strong alloy steel pin. Minimum cable replacements. Furnished complete as shown. Write for details.

2000 to 8000 lbs.

CAPE ANN ANCHOR & FORGE CO.
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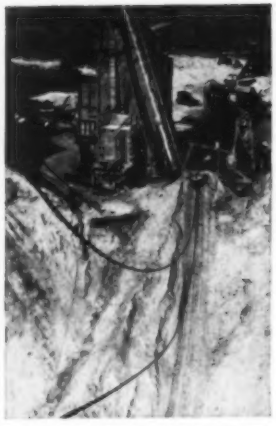
MORE YARDAGE—per hour, per dollar!



Here a 1 cu. yd. Sauerman Scraper digs gravel from high hill and feeds screening plant at rate of 1100 tons a day, at an amazingly low cost.

with a

SAUERMAN SCRAPER

Step up the yardage you move each hour — as you lower material handling costs — with a Sauerman Power Drag Scraper. This rugged, versatile machine combines digging, hauling and dumping in a continuous, one-man operation.

Crescent bottomless scoop, an exclusive feature of Sauerman Scraper machine, handles larger loads faster, using less power than similar sized scrapers — digs effectively in any kind of earth or bulk material.

So for performance and economy, always depend on efficient Sauerman machines. Send today for new catalog.

SAUERMAN BROS., Inc.
534 SO. CLINTON ST. CHICAGO, ILLINOIS
Power Scrapers & Cableways
SINCE 1909

Sand and Gravel Corporation, for purposes of income tax deductions, has apportioned 75 percent of the depreciation on its machinery and equipment, including the vessels here involved, to the District, and also has apportioned 75 percent of its income from its sand and gravel business (sales and services) as derived from District of Columbia sources.

The higher court held that the District of Columbia could tax the equipment, vessels, etc., on a fair apportionment valuation basis as between the District and adjoining states from which the vessels transported sand and gravel to storage places in the District. This court said:

"Permanency in the sense that it must be fixed like real property is not essential to the establishment of a taxable situs for personal property. It seems to be sufficient for valid taxation if in the ordinary course of business, the property is present and being used and employed with a consistent continuity and not spasmodically. Under the foregoing decisions there can be little question that respondent's vessels have a situs in the District which would support an apportionment tax."

For comparison see *Island Fuel & Transportation Co.*, 313 Ky. 400. Here taxes had been levied in Kentucky on barges and tow boats owned by a Maine corporation. Its principal place of business was in West Virginia. It also had extensive installations in Ohio. It maintained mooring facilities in a county of Kentucky, "which are used when the exigencies of navigation require." It made calls at Kentucky ports and habitually operated its boats and barges along a regular route between Huntington, W. Va., and Cincinnati, O., of which route 94.6 percent was in Kentucky. The company contended that the vessels were only transiently present in Kentucky, with no termini or regular port of call or destination in that state; that they were not permanently situated in Kentucky and therefore had no taxable situs there.

The higher court held that the state of Kentucky could tax the vessels.

For further comparison see *Queen City Company v. District of Columbia*, 134 F. (2d) 44. The company manufactured and sold products in Cumberland, Md., to a distributor located in the District of Columbia. The distributor would send his trucks to Cumberland for the products and transport them to Washington. The company had no office or other place of business in the District; was not engaged in business in the District; and had no interest in the business of the distributor.

Under these circumstances, the higher court held that the District of Columbia could not tax the company's personal property.

Validity of Taxation

Another reader asked these questions: "What state taxation laws are valid which tax corporations that transact interstate commerce business? Is a state law valid

which taxes motor trucks used to transport cement, sand, and gravel, etc., in interstate commerce?"

First, it is important to know that a state may tax a company's real and personal property used in interstate business if the taxation is not discriminatory and does not favor intrastate business. Nevertheless, when not trenching upon the prerogatives of the national government or violating the guarantees of the Federal Constitution, the States have the attribute of sovereign powers in devising their fiscal systems to insure revenue and foster their local interests. The states in the exercise of their taxing power are, of course, subject to the requirements of the due process and the equal protection clauses of the Fourteenth Amendment, but this constitution and amendment imposes no iron rule of equality nor prohibits the flexibility and variety that are appropriate to modern schemes of taxation. Hence, the state may tax real and personal property in a different manner, and it may grant certain well founded exemptions.

Notwithstanding these rules of law, a state taxation law generally is invalid which *unduly* interferes with interstate commerce. However, this latter rule of law is *not* applicable with respect to taxation of interstate motor vehicles where the state tax is intended to be used to construct and maintain the state's highways.

For illustration, in *Capitol, 70 S. Ct. 806*, the Supreme Court of the United States upheld the validity of a state law which taxes interstate motor vehicles.

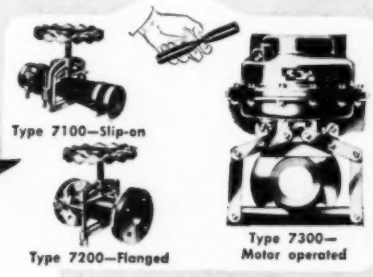
This court also explained that a state tax on interstate vehicles is *void* if the testimony shows any of these facts: the privilege of using the highways is not considered in the tax law; the tax favors intrastate commerce and discriminates against interstate commerce; or the tax law specifies that the tax is for the privilege of doing interstate business instead of paying expense of constructing and maintaining the state's highways.

Loaned Employee Is Killed

Another reader asked this question: "I have several regular employees in my sand and gravel business. Sometimes I loan an employee to assist a customer. If the employee is injured, who is liable for payment of compensation?" The answer is: The regular employer is liable.

This is so because the courts hold that in order to transfer liability from the general employer to the one to whom the employee is loaned, there must be some consensual relationship between the loaned employee and the employer whose services he enters, sufficient to create a new employer-employee relationship. In other words, where an employee enters the service of another at the command and pursuant to the direction of the master, no new relationship is created. While the employee may be subject to the direction of the temporary employer, he is there in obedience to the command of his employer, and in doing what the

if it Flows . . .



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Cement
Clay
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Flex-Valve it

FLEX-VALVE is the ideal choice for handling such materials as those listed—either dry or in suspension—at temperatures up to 210 deg.

Resists both abrasion and corrosion; eliminates clogging, plugging, building up; absorbs vibration and misalignment.

Open—it's as free of obstruction as the pipe itself. Closed—it's bubble-tight and it closes tight on all of these materials.

Available in either hand or air operated types in sizes from ½ to 12 in.

Users have found FLEX-VALVE to be the low-cost solution to tough valving problems. If your present valves aren't 100% effective, take a look at this one. Catalog 455 gives details.

FLEX VALVE

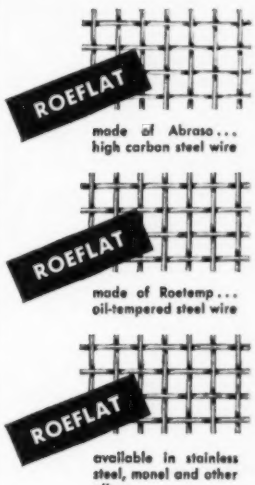
Flexible Valve Corporation

7885

441 COMMERCIAL AVE. • PALISADES PARK, N. J.

AGGREGATE WIRE SCREENS

Roebling offers the right metal or alloy for extra economy


ROEFLAT
made of Abraso . . . high carbon steel wire
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made of Roetemp . . . oil-tempered steel wire
ROEFLAT
available in stainless steel, monel and other alloys

WHETHER ROEBLING ROEFLAT or some other construction best meets your screening requirements, Roebling goes a long step farther . . . offers you each and every construction in the exact metal or alloy to bring maximum screen life and economy in your operations.

As one example, the vastly increased working life afforded by Roebling Roeflat's unique construction can be boosted still further by adopting Abraso, for its high resistance to vibration fatigue; Roetemp, for abrasion and fatigue resistance; stainless steel, monel or other alloys to overcome corrosion problems.

Get the whole Roebling Aggregate Screens story . . . write for Catalog W-903.

WOVEN WIRE FABRICS DIVISION

John A. Roebling's Sons Company
Roebling, New Jersey

Woven Wire Fabrics Division
John A. Roebling's Sons Co., Roebling, N. J.
Gentlemen: Please send me free copy of Catalog W-903 giving up-to-the-minute information about Aggregate Screens.

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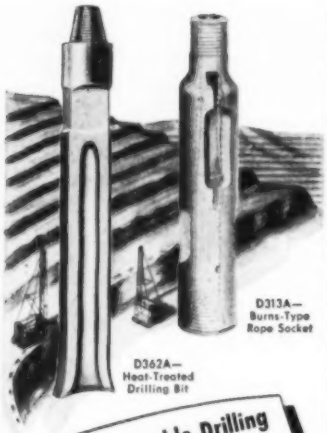
ROEBLING



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- **PROSPECT HOLES**
- **SAMPLING**

SAFE • EFFICIENT • ECONOMICAL

Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.

D606—Reamer-Type
Pilot Bit

LARGE BITS
for pilot hole drilling and stage enlargement reaming of dewatering, ventilation and escape holes.

D370F—Prefabricated
Star Bit

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new employer directs him to do, he is performing his duty to the employer who gave the order.

For example, in *Shamburg v. Fairbury Cement Block Company*, 45 N.W. (2d) 446, the testimony showed facts as follows: One Orin was employed by the Fairbury Cement Block Company. Orin was paid by the hour, once a month. He was carried as an employee on the records. A stock pile of blocks was kept on hand for sales generally made during the building season in the spring and fall. During the winter when the days are warm enough, the blocks are manufactured. These matters were attended to by Orin. One day the Fairbury Cement Block Company loaned Orin to a sand-and-gravel company. While working for the latter, Orin was killed.

In subsequent litigation the higher court ordered the Fairbury Cement Block Company to pay compensation to Orin's dependents, saying:

"The evidence in the instant case shows that Orin's contract for hire was made with Fairbury Cement Block Company. The fact that Weblemoe (Fairbury Cement Block Company) directed the deceased in the performance of the work he was doing does not change the situation. In the case of a loaned employee, such direction and control is necessary and present."

Disablement vs. Disability

Recently a higher court explained that from a legal standpoint, in case of silicosis, "disablement" means the event of the employee becoming actually incapacitated, because of such disease, from performing any work in any remunerative employment; and "disability" means the state of being so incapacitated. An employee can perform some work in a remunerative employment does not have "total disability" as used in the accident compensation statutes.

For example, in *Carlson v. Small Leasing Company et al.*, 225 Pac. (2d) 469, it was shown an employee was subject to dust conditions when working around a shaker screen.

The higher court held that the evidence sustained the conclusion that the operator of the shaker screen was not totally disabled due to silicosis and hence was not entitled to compensation. The court said:

"There is no question but what claimant is greatly disabled by silicosis. At most, *the claimant proved partial disability from silicosis*, which under the statute is not compensable."

Plans and Specifications

Considerable discussion has arisen from time to time over the legal question: "Is a subcontractor bound by plans and specifications furnished the general contractor by a property owner?"

According to a leading higher court decision, the answer is yes.

For illustration, in *Cold Spring Granite Company v. Jacobson Brothers*, 228 N. W. 344, it was disclosed that a general contractor had a contract to con-

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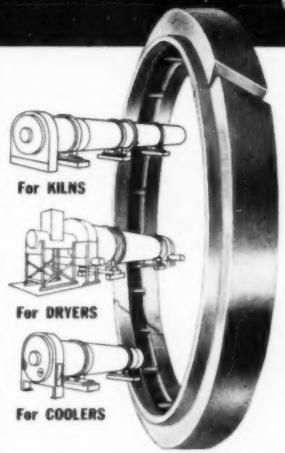

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struct a building. A granite company took a subcontract from the general contractor for furnishing all the granite necessary for the construction of the building, for the sum of $21,000. Discussion arose between the general contractor and the granite company for payment of certain extra items and materials. The general contractor verbally promised that he would pay the granite company, providing the property owner paid him.

The property owner refused to pay the general contractor for these "extras," claiming that, under the plans and specifications, these extra items are within scope of the general contractor's contract. The contract specifically referred to the plans, drawings, and specifications, which were made a part of the contract. Since these extra items were *not* legal "extras" because the plans and specifications included them, the higher court held the general contractor not required to pay the granite company for these "extras" and said:

"The jury was justified in believing that the defendant (general contractor) did not specifically or impliedly consent or promise to pay the items and that they were only to be paid in case of their allowance as 'extras'."

Written Notice Not Needed

Considerable discussion has arisen from time to time over the legal question: "If a shipper *fails* to comply with the terms of a bill of lading and does not notify a common carrier of damage to shipped merchandise, is the carrier liable?" The answer is yes, *if* the testimony shows that the carrier had actual knowledge of the damages.

For example, in *Hopper Company v. Baltimore*, 178 Fed. Rep. (2d) 179, it was shown that a carload of products was shipped under a bill of lading which provided that the consignor could not recover for damage or loss unless a claim was filed in writing within nine months after a reasonable time for delivery has elapsed.

The consignor sued the carrier for value of the products destroyed in a railway wreck. The carrier refused to pay the claim amounting to $4,224 because the consignor had failed to file a claim in writing within nine months.

The testimony showed that the carrier had notified the consignor by wire that the products had been destroyed in an accident. Although the consignor had failed to file the written claim within nine months, the higher court held the carrier liable, and said:

"The purpose of the stipulation is not to escape liability, but to facilitate prompt investigation. . . . In such a situation a formal notice by plaintiff (consignor) to the defendant (carrier) could not have accomplished anything more."

For comparison, see *Lehigh Valley R. Company v. State*, 21 F. (2d) 396. Here the testimony showed that a carrier had written a letter to a shipper advising him that the goods shipped had been destroyed.

The court held that since the carrier had knowledge of the loss which it had reported to the consignee, the shipper could recover the value of the destroyed

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merchandise although the latter had failed to comply with the bill of lading and did not send the carrier a written notification of the loss. This court said:

"We conclude that the carrier may not use the provisions of the bill of lading to shield itself from the liability imposed upon it by the statute and the common law for its negligent destruction of the shipper's property. To hold otherwise would not be construing the bill of lading 'in a practical way'."

Must Prove Silica Hazard

Recently a higher court held that an employe cannot recover compensation for a claimed disability of silicosis unless he proves that he had worked in the state at least four years while exposed to silica hazard.

For example, in *Sulewski v. Baldwin*, 77 Atl. (2d) 715, it was shown an employe sued his employer to recover compensation under the State Workmen's Compensation Act for total disability resulting from silicosis. Both the referee and the board disallowed compensation on the ground that the employee had not been exposed to a silica hazard. The higher court affirmed the lower court because the employee failed to prove that he had an aggregate employment of at least four years in the state during a period of eight years next preceding his disability, in an occupation having a silica hazard.

Customer Falls Down Stairs

According to a recent higher court, a customer who sustains an injury on premises on which nonmetallic mineral products are sold, and while in a location not intended for use of customers, such injured customer *cannot* recover damages.

For illustration, in *Francis v. Cleveland Company*, 55 S. E. (2d) 499, it was shown that a customer went into an area not intended for customers. In so doing, he fell and suffered severe personal injuries.

The higher court refused to hold the proprietor liable in damages because the area where the customer was injured was *not* open for the accommodation of customers.

Can Go Through Red Light

Drivers of motor trucks used to transport nonmetallic mineral products should be warned of their liability for failure to stay clear of an emergency automobile. Recently a higher court held that the driver of an emergency ambulance is not responsible for a collision when going through a red light or stop sign at a street intersection.

Therefore, drivers of private vehicles cannot avoid responsibility for a collision by testifying that he did not see the ambulance or emergency vehicle or hear its siren.

For example, in *Hardy v. Gilbert*, 42 So. (2d) 158, the testimony showed facts as follows: An ambulance owned by the Daigre-Gilbert Undertaking was making an emergency run. The red emergency warning light was blinking and its siren sounding continuously. When the ambulance reached a street intersection the driver ran through a red stop light. The driver of a motor truck owned by a quarry company did not hear the siren and entered the intersection. A serious collision resulted causing considerable damage to both vehicles.

In subsequent litigation, the higher court held the owner of the truck liable for the accident, and said:

"There is no doubt that the ambulance had its warning lights blinking and its siren sounding as proven by the two police officers who saw the collision. . . . The plaintiff (truck driver) was chargeable with the knowledge that under the law an ambulance could, under certain conditions, proceed against a traffic signal or stop sign. The siren was heard by the two traffic officers and there was no reason why the plaintiff (truck driver) should not have heard it also. Under the law he is chargeable with hearing what he should have heard. . . ."

Must Prove Verbal Contract

Generally speaking, a higher court will compel a property owner to pay the full amount of a contractor's bill for work performed if the property owner relies on an alleged verbal agreement as to the contract price, and fails to have witnesses testify in his favor.

For example, in *Aberdeen Company v. Foster*, 222 Pac. (2d) 824, a property owner named Foster made a verbal arrangement with a general contractor to do certain work.

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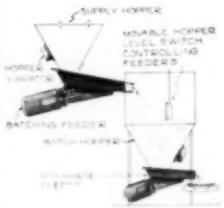

2 VOLUME BATCH WEIGHING
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Literature on request

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In subsequent litigation Foster testified that the general contractor had verbally agreed to complete the job for $12,000, but Foster failed to prove by witnesses that the contractor made this alleged verbal promise or agreement. The higher court ordered Foster to pay the contractor $19,596 and said: "Costs may have been somewhat increased due to changes in the plans and materials as the work progressed. Labor costs were increased substantially because Hedstrom (general contractor) kept his crew on the job regardless of weather. The months of February and March were exceptionally wet, and the efficiency of employees was reduced about 50 percent on rainy days."

traffic news

CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 88289 (1)—Proposed to establish on crushed stone screenings in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from McVittys, O., to Maybee, Mich., 190 cents net ton.

Docket 88291 (1)—Proposed to establish on sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Montezuma, Ind., to Dan (Wabash River Ordnance Plant), Ind., 94 cents net ton.

Docket 88296 (1)—Proposed to establish on sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) or gravel in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Kise, Ky., to the following points in Ohio:

	Per Net Ton
Coal Grove and Ironton	$1.71
Portsmouth and Sciotoville	1.83
Lucasville and Otway	1.95
Peebles, Piketon, Waverly, Higbys, Chillicothe	2.07
Columbus	2.13
Duvalls, Gernon, Hillsboro Williamsburg	2.31
Clare	2.43
Kingston, Circleville, Sardinia, Winchester	2.19

Docket 88310 (2)—Proposed to establish on crushed stone, crushed stone screenings, as described in Item 10 of CMSTP&P GFD No. 14845-D, IRC 209, carload minimum weight as indicated therein from Bedford, Coxton, Heltonville, and Oolitic, Ind., to C&EI Index No. 413 Young, Ind., to C&EI Index No. 440 Peerless, Ind., 169 cents inclusive.

Docket 88313 (1)—Proposed to establish on crushed stone, carload, in open-top cars, minimum weight 90 percent of the marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Lima, O., to Jackson, Mich., 201 cents net ton.

GENERAL FREIGHT TRAFFIC COMMITTEE EASTERN RAILROADS

Bulletin G-4039 (Shipper)— Proposed to establish on limestone, natural, ground or pulverized, unburned, carload minimum weight 60,000 lb., from Marlo, Mosher, and Ste. Genevieve, Mo., to Bridgeton, N. J., $6.85 in open cars, $7.28 in closed cars, per net ton, subject to ExParte 175 increase.

Bulletin G-4074 (Shipper)—Proposed to establish on stone, fluxing, carload minimum weight 80,000 lb., from Buffalo, Black Rock, and East Buffalo, N. Y.

To	In Closed Cars Per Gross Ton	In Open Cars Per Gross Ton
Syracuse, N. Y.	2.22	1.91
Utica, N. Y.	2.26	1.95

Subject to ExParte 175 increase.

ILLINOIS FREIGHT ASSOCIATION

Docket Irc 511-1059—Proposed to establish on agricultural limestone, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, from Ullin, Ill., to L&N Railroad Stations in Illinois: Present, Ashley, Ill., combination rates. Proposed, rates in cents per ton of 2,000 lb.

To Representative Points	Present L&N Rate From Junction	Proposed*
French Village, Belleville, Nashville, Mt. Vernon, Ill.	69	129
Maunie, Ill.	84	145
Shawneetown, Ill.	97	160

*Including ExParte 162, 166 increases and subject to ExParte 168, 175 increases.

PACIFIC SOUTHCOAST FREIGHT BUREAU PROPOSALS

Docket (X) 1866 (Carrier)—Lime rock as described in Item 1300-B, Supplement 148, Pacific Southcoast Freight Bureau tariff 278, from Victorville and Ore Grande, Calif., to Santa Monica, Calif., proposed to publish through commodity rate of 9 cents per hundredweight, subject to X-166-8, minimum 20 tons.

Docket (X) 1867 (Shipper)—Proposed to establish on rock, rhyolite, crude or crushed, carload, from Divide, Ariz., to Phoenix, Ariz., rate of 6 cents per hundredweight, minimum 50 tons in AT&SF Tariff 14228-B.

Docket 1869 (Shipper)—Proposed to establish on gypsum, in closed cars, carload, from Gerlach, Nev., to Alviso, Agnew, Mountain View, Sunnyvale, and San Jose, Calif., rate of 18 cents per hundred-

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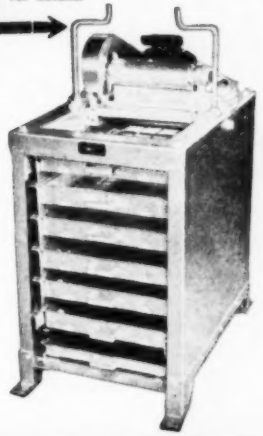

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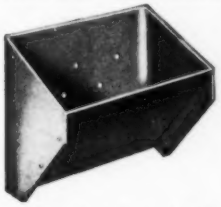

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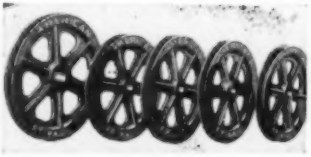

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weight, subject to X-162-6-8 and 175, minimum 85,000 lb. in Pacific Southcoast Freight Bureau tariff 273-A.

Docket 1881 (Shipper)—Request for rate of 10½ cents per hundredweight on lime rock, crude, crushed, ground or powdered, in closed cars, carload, from Sonora to Oakland, Calif., minimum 50 tons, in item 300, Pacific Southcoast Freight Bureau Tariff 278.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Docket 56332 (1)—Proposed to establish on slag (except ground open-hearth basic slag or basic phosphate slag), Birmingham and Ensley, Ala., to Weeks, La., rate of 295 cents per ton of 2,000 lb., including X-162.166 and 168 increases, minimum weight 90 percent of marked capacity of car, except that actual weight will govern when car is loaded to full visible capacity.

Docket 56548 (2)—Proposed to apply on gypsum, crude or crushed, Southwest to Southern Territory, 10 percent increase under ExParte 168 instead of 9 percent.

FREIGHT TRAFFIC COMMITTEE TRUNK LINE TERRITORY RAILROADS

Docket TL M-1383 (Carrier)—Sand (except sand, molding, bonded—naturally or otherwise—and except ground or pulverized sand) and gravel, in open-top cars, without tarpaulin or other protective covering, carload minimum weight 90 percent of marked capacity of car, from Montoursville, Pa., to Silverbrook, Pa., $1.58 per net ton, subject to ExParte 175 increase, in lieu of $1.71.

Docket TL M-1388 (Shipper)—Limestone, crude, fluxing, foundry and furnace, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, from Chester Valley, Pa., district, that is: Rambo, Devault, Bluebell, Bridgeport, Cedar Hollow, Cold Point, Exton, Howellville, Mill Lane, Plymouth Meeting, Shainline, Swedeland and Williams, Pa., to Sparrows Point, Md., $1.70 per gross ton, subject to ExParte 175 increase, in lieu of $1.80.

Docket TL M-1392 (Shipper)—Proposed to establish on crushed stone, carload minimum weight 90 percent of marked capacity of car from Bowden, W. Va., to Donaldson, W. Va., $2.19 per net ton, subject to ExParte 175 increase.

Docket TL M-1393 (Shipper)—Proposed to establish on stone, crushed, and screenings, in straight or mixed carloads, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, from Pleasant Gap, Pa., to State College, Pa., $1.00 per net ton, subject to ExParte 175 increase, in lieu of $1.58.

Docket TL M-1397 (Shipper)—Sand and gravel, carload minimum weight 90 percent of marked capacity of car, from Manumuskin, N. J., to Salem, N. J., 87 cents per net ton, subject to ExParte 175 increase, in lieu of $1.01.

Docket TL M-1405 (Shipper)—Stone, crushed, and screenings, in bulk, in open-top cars, in straight or mixed carloads, minimum weight 90 percent of marked capacity of car, from Union Furnace, Pa., to Barnesboro, Pa., $1.45 per net ton, subject to ExParte 175 increase, in lieu of $1.58 and to expire November 1, 1951.

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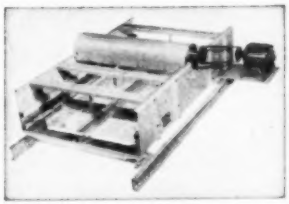

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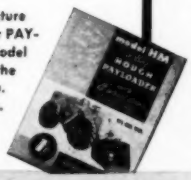

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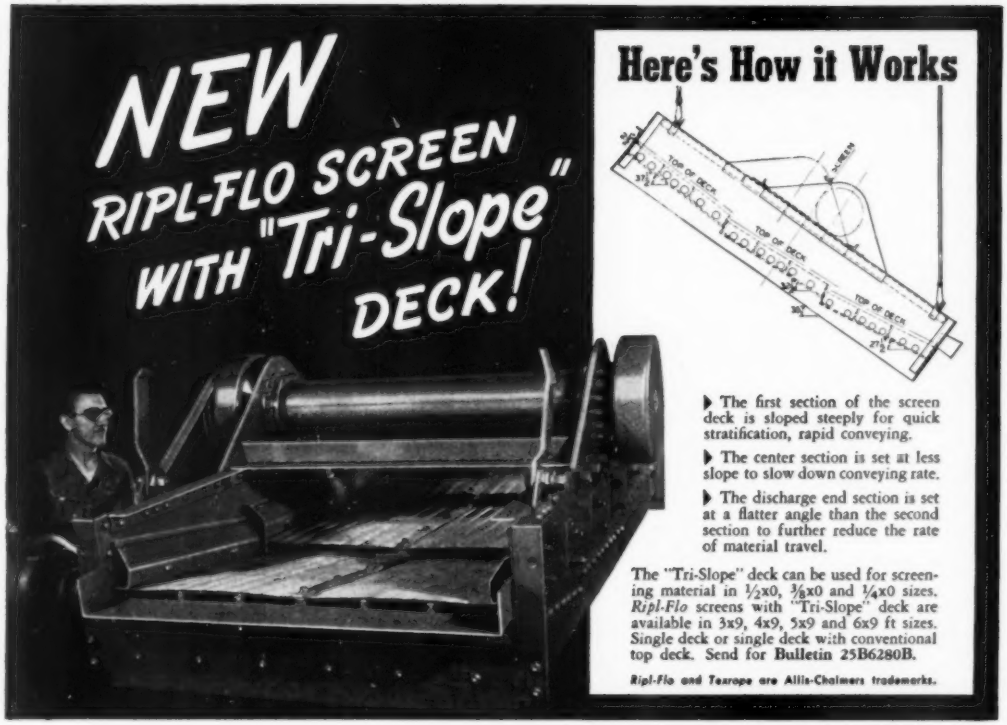

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Ripl-Flo screens with new "Tri-Slope" deck feature a deck divided into three sections, each at a decreasing slope to provide a high rate of travel at feed end to reduce bed thickness and obtain rapid stratification . . . a retarded conveying rate on the second section . . . a further reduced rate at the discharge end as the bed becomes thinner, to pass marginal pieces through the screen.

"Sta-Kleen" deck construction makes it possible to screen with higher surface moisture than was previously considered practical . . . and get increased screening capacity.

Special shaped rubber balls bounce between the screen surface and a ball retaining deck located several inches below the screen cloth. These balls dislodge fine particles clinging to the screen cloth. For more facts, contact your A-C sales office, or write Allis-Chalmers, Milwaukee 1, Wis.

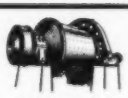
ALLIS-CHALMERS A-3256

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Motors

Control

Texrope Drives


Grinding Mills

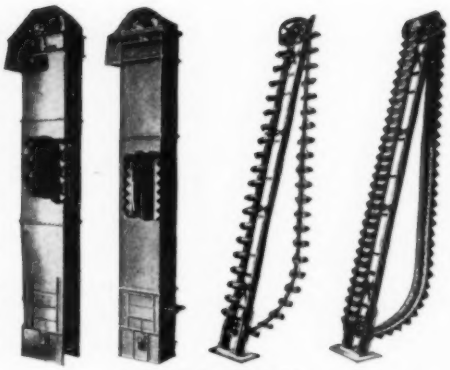
Crushers

Kilns, Coolers, Dryers

50 LB. 1¼X8
HERCULES
GELAMITE
2
50 LB. 1¼X8
HERCULES
HERCOMITE
4
GET MORE FOR EVERY DOLLAR

Partial List of WHAT WE MAKE

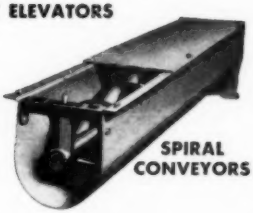
TO HELP YOU IN YOUR HANDLING AND PROCESSING OPERATIONS



BUCKET ELEVATORS

BELT CONVEYORS—IDLERS

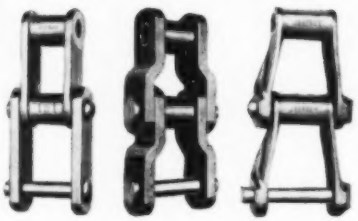
Check these items . . . likely you need one or more right now. We build a complete line of equipment for handling, processing and reducing all kinds of material. We cannot show everything Jeffrey builds to speed production and cut costs, but send for Booklet No. 832 for a quick picture of our extensive line. Jeffrey's engineering facilities are available for laying out complete handling and processing systems or the application of individual units.



SPIRAL CONVEYORS

SCRAPER CONVEYORS

For handling bulk material horizontally or on incline, discharging at fixed point through valves in trough bottom. Also wood or steel Apron Conveyors.



CHAINS SPROCKETS ATTACHMENTS

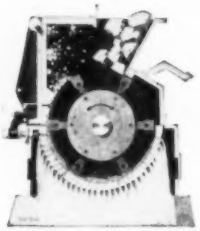
FEEDERS—CONVEYORS

A wide range of sizes and types in electric vibrating feeders, conveyors, screens, packers, etc. Absolute control over tonnage handled.

M-V MECHANICAL VIBRATING CONVEYORS

For conveying abrasive, lumpy or rough materials, hot or cold, dry or wet, as well as fine materials. Up to 80' can be operated by one drive unit. Also electric vibrating conveyors, feeders, screens and packers.

More detailed information on request.



CRUSHERS—SHREDDERS GRINDERS—PULVERIZERS

BARREL PACKERS

For economy in packing operations—reduce size of container, increase its capacity and cut shipping costs. Also conveyor-type packers and packing tables.

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Established 1877

917 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

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Jeffrey Mfg. Co. Ltd., Montreal, Canada
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British Jeffrey-Diamond Ltd., Wakefield, England
The Galion Iron Works & Mfg. Co., Galion, Ohio
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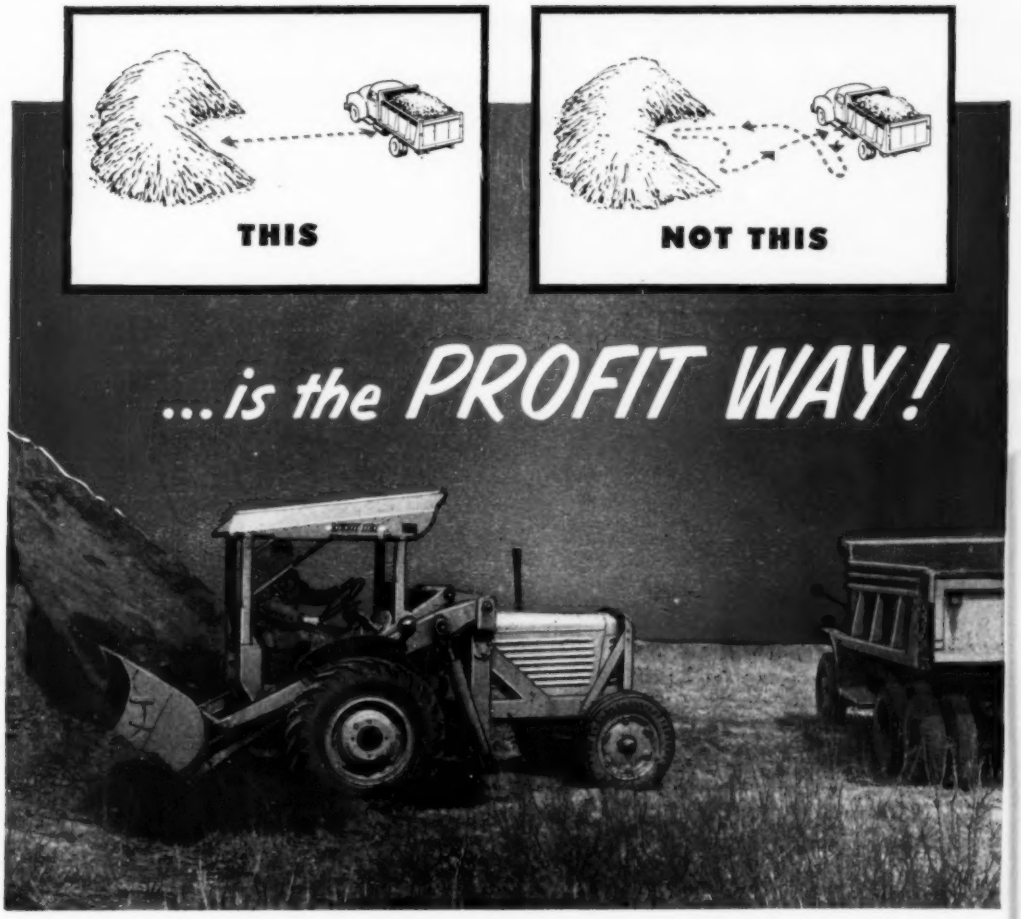


You cut out costly loading "detours"... save time and effort . . . with an Oliver Industrial Wheel Tractor and Strait-Line Loader. This revolutionary hydraulic, double end tractor-loader can load either in front or rear . . . dump in front. The operator can load and dump without twisting or turning the tractor . . . travel a *straight line* between pile and truck.

Rear-end digging gives you far more loads with far less effort. "Push-Tilt" bucket with penetrating lips gives you a bigger load every time. With bucket carried in the rear, *and low,* additional traction is created, assuring far greater mobility and maneuverability in any kind of going. Rear-carried bucket puts increased load on rear wheels for increased traction . . . lightens load on front wheels for far easier steering.

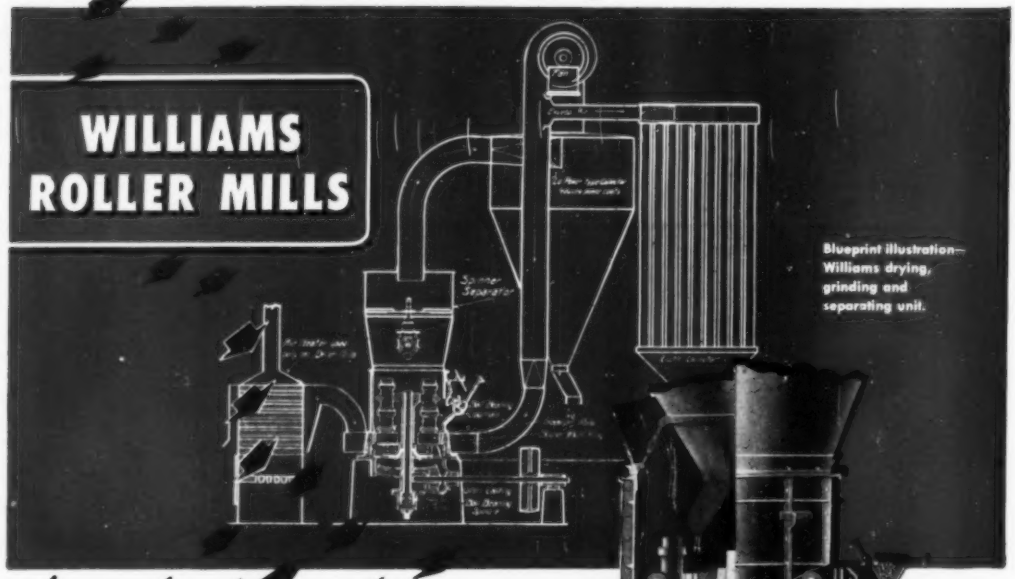
Investigate the Oliver—Strait-Line for your operations. Your Oliver Industrial Distributor will give you the complete details. Or, write The Oliver Corporation, Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio.

THE OLIVER CORPORATION

A complete line of industrial wheel and crawler tractors

For those Fine Grinding Jobs . . .

WILLIAMS ROLLER MILLS



Blueprint illustration—Williams drying, grinding and separating unit.

let's look at the record

LIMESTONE

Many Williams Roller Mills are satisfactorily grinding limestone to 99% 325 mesh or 85% 200 mesh and for all other commercial uses finer than 40 mesh.

LIME

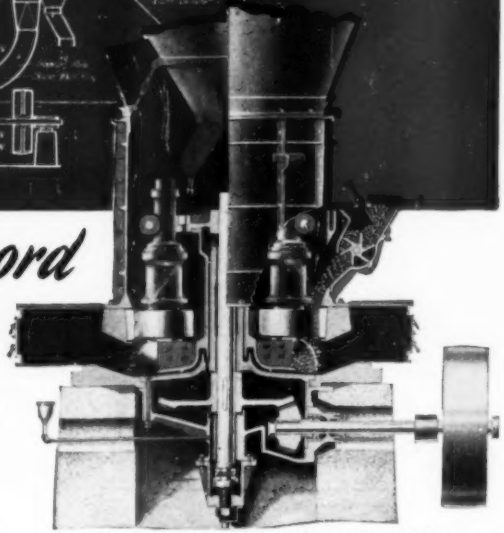
Both burned and hydrated lime can be satisfactorily processed in Williams Roller or Impact Mills. Automatic throw-out rejects impurities and unburned cores. Dustless operation.

CLAYS, TALC, KAOLIN

Can be reduced to any fineness from 40 mesh to micron sizes. Impurities removed by automatic throw-out.

DRY AND GRIND SIMULTANEOUSLY

Simply by introducing hot air, all sizes dry as they grind eliminating the need of separate drying equipment.



Sectional view of Roller Mill showing how material is ground between rolls and bull ring, then air swept to Separator which extracts fines and returns oversize for re-grinding.

WILLIAMS ALSO MAKES . . .

Heavy-duty hammermills for all quarry operations; impact and roller mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "packaged" crushing and grinding plants.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 ST. LOUIS AVENUE ☆ ST. LOUIS 6, MO.

WC49-11PO

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

What's U. S. Rubber doing about rock haulage?

"U. S." is helping to increase the output of rock quarries, by developing conveyor belts which can handle greater loads with lower upkeep costs.

All the belts shown in these pictures of a Kentucky quarry were designed by United States Rubber Company engineers in cooperation with the quarry and equipment engineers. The ultimate result is a lowering in the quarrying cost and a rise in production—a familiar "U.S." story in every branch of industry.

These three U.S. Giant Conveyor Belts have been carrying the plant's output for 5 consecutive years.

This is the main conveyor belt, 1400 feet long. It carries the stone from the stock pile to shipping point.

These 3 belts complete the 100% U.S. Rubber Conveyor Belt installation in the quarry.

PRODUCTS OF

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Steel Scrap is Very Scarce!

You have given your sons to the Armed Forces

You have devoted your plants to the defense effort

You have joined Civilian Defense

You have bought Defense Bonds...given your blood

Now... will you turn in your scrap?

Without vital scrap, the steel so desperately needed cannot be made.

Round up your scrap—call in your scrap dealer *TODAY!*

The Colorado Fuel and Iron Corporation

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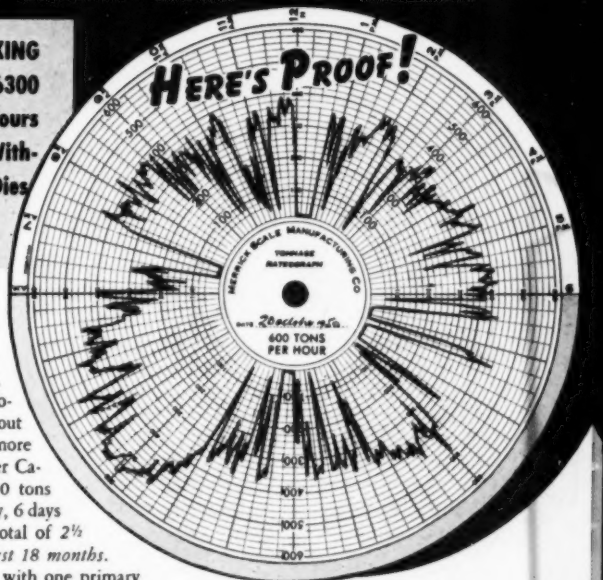
AMERICAN WIRE FABRICS CORPORATION, Mt. Wolf, Pa.
CLAYMONT STEEL CORPORATION, Claymont, Del.
THE CALIFORNIA WIRE CLOTH CORPORATION, Oakland, Calif.
WICKWIRE SPENCER STEEL DIVISION, New York, N.Y.

Reduces 2½ MILLION TONS

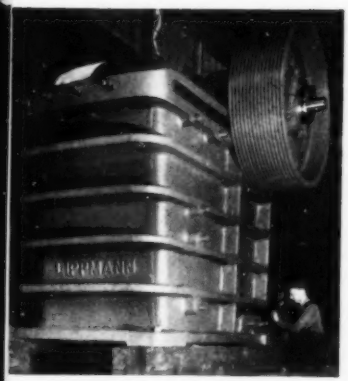
of Blast-Run Niagara Limestone to Minus 3 in. IN 18 MONTHS . . . WITH ONE CRUSHER!

Miron Brothers Fastest Growing Aggregate Producer In Canada . . .

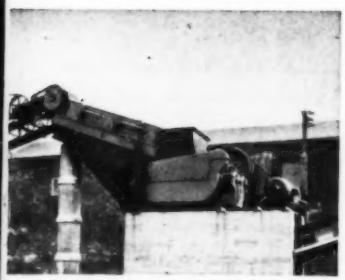
Rock-Ravenous 36 x 48 GRIZZLY KING Jaw Crusher Often Produces 6300 Tons per Day . . . Works 20 Hours a Day, 6 Days a Week Without Shutdowns! And Jaw Dies Haven't Even Been Turned!



Actual weight chart of a typical day's production, recorded by scale under discharge conveyer, is proof that Grizzly King's output reaches 560 tons per hour.



In complete Lippmann plant, Miron Bros. makes six sizes of stone — everything from ag-lime to ballast rock.



Other Lippmann equipment at Miron: two 48 x 24 roll crushers, five 5 x 12 Screen-All vibrating Screens, 591 ft. of belt conveyors with Life-Sealed Ball Bearing Idlers.

Two years ago the site of the Miron Bros. plant at Ville St. Michel, Quebec, was a farm. Today they are turning out what is believed to be more aggregate than any other Canadian producer — 300 tons per hour, 20 hours a day, 6 days a week—the amazing total of *2½ million tons in their first 18 months.*

And they're doing it with one primary in a plant that's completely Lippmann-engineered and Lippmann-built . . . from the 36 x 48 GRIZZLY KING Jaw Crusher, the world's highest capacity overhead eccentric, through scalper, belt conveyors with Life-Sealed Ball Bearing Idlers, Screen-All Vibrating Screens with perfect-circle throw, and Roll Crushers.

They're feeding hard, blast-run Niagara Limestone up to 36 in. directly to the GRIZZLY KING, with the discharge opening set *down to 3 in.* And the crusher actually idles a good share of the time!

Amazing Capacity!

There isn't another crusher built that approaches GRIZZLY KING's capacity — extra long jaws, engineered crushing action, complete oil lubrication and alloy steel construction add up to the rock-eatingest crusher on the market today. And its low-maintenance operation is proved by the fact that Miron *hasn't even turned the jaw dies* after 2½ million tons.

You, too, can pile up extra profits with the world's lowest-cost-per-ton-crushed rock and ore machinery. And Miron is doing all this with an *investment of only $125,000* in super-capacity, low-cost Lippmann equipment.

Write today for all the facts on the complete line of Lippmann machinery for pits, mines and quarries. Follow the example of leading operators the world over who choose Lippmann above all other makes.

2003

WRITE FOR ALL THE FACTS on the complete Lippmann line for pits, mines and quarries:

Grizzly King Jaw Crushers (Bulletin 1100), Screen-All Vibrating Screens (1200), Belt Conveyors (1400), Pulverizers (1160), Life-Sealed Ball Bearing Idlers (1410), Gyra-Gnome Secondary Crushers, Circuit Rider Self-Propelled Crushing Plants, Portable Washing Plants (1650), Apron Feeders (1450).

LEW **LIPPMANN** ENGINEERING WORKS

4603 W. MITCHELL STREET
MILWAUKEE 14, WISCONSIN

C TOURNAROCKER boosts production 38% for McGraw Construction Co.

Here's another time study from McGraw's records: During a 26½-hour period, the C Tournarocker hauled 1844 cu. yds. of slag over 2500' one-way distance. That's 69.6 pay yards per hour.

Tournarocker, Tournahopper, Tournahoist—Trademark
Tournapull, Tournamixer, Tournatrailer—Trademark Reg. U.S. Pat. Off. C146

On steel mill expansion in southern Ohio, McGraw Construction Company, Inc. of Middletown had 200,000 cubic yards of slag to move from new building areas. Material was shovel-loaded into 2 conventional 15-ton dump trucks and one 16-ton, rear-dump C Tournarocker . . . then hauled about half a mile for use as railroad fill. Contractor's records, covering a period of 1080 working hours, show the Tournarocker delivered 4618 loads, or 59,430 cubic yards . . . an output 38% greater than either of the 2 trucks. Both trucks were loaded by the same 1½-yd. shovel and worked the same haul as the Tournarocker, yet one moved only 43,000 yards; the other, 41,800 yards. Of the 144,230 yards placed on the fill by all 3 haul units, Tournarocker handled 41% . . . the first truck, 30% . . . the second truck, 29%.

5000′ cycle every 12 minutes

On a typical 2500-ft. one-way haul, the high-speed "C" delivered 13 pay yards of slag every 12 minutes. That's 5 loads . . . 65 cubic yards hourly . . . or about 120 tons of the 3700-lb. material per hour for McGraw Construction Company's LeTourneau rear-dump hauler.

Profit Insurance—Tournarocker body is readily interchangeable behind "C" prime mover with equipment shown below.

In dump position, back end of Rocker body is below rear wheels...bowl rests on edge of bank...loads dump clear. Drive wheels are always on firm ground.

Superintendent Frank Conner stressed high mechanical efficiency and exceptional mobility as the main reasons for Tournarocker's greater output. "The unit has been 95% efficient," he said. "Its small turning radius (13'9") was a decided advantage on the fill. No widening or turn-around expedients were necessary."

Reaches haul speeds of 35 m.p.h.

In addition, Tournarocker provided a lot of other speed advantages which both owner and operator liked. Oversize disc-type air brakes on all 4 wheels (total braking surface, 4,176 sq. in.) gave the operator complete confidence to use 35 m.p.h. haul speeds. Simple fingertip electric hoist raised body to vertical position in a few seconds...streamlined bowl cleared loads instantly.

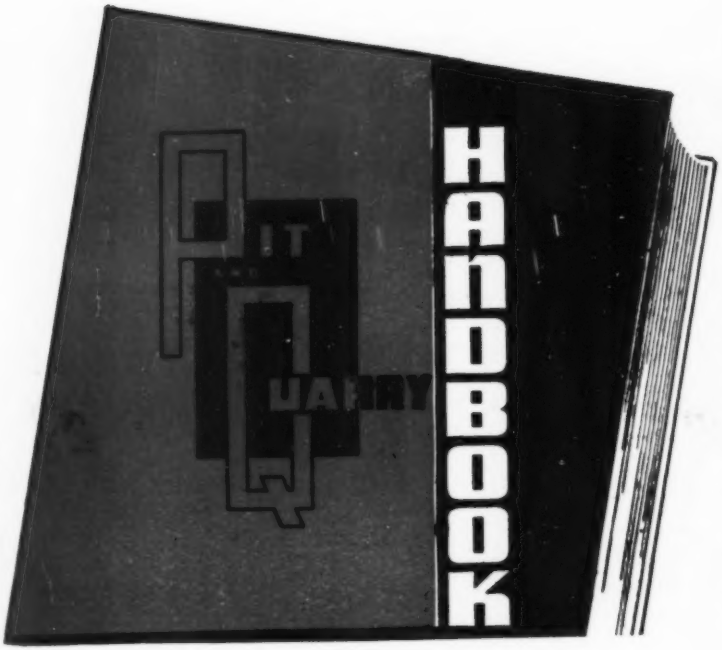
Tournarocker advantages which helped McGraw Construction Co. increase production and cut costs on their slag-moving, offer new low costs on your hauls, too. NEW C Tournarockers have increased capacity of 18 tons, 12½% greater than the McGraw machine described here. Ask your LeTourneau Distributor about this new 18-ton . . . also, 9-ton and 35-ton Tournarockers.

Operator on McGraw's 1½-yard shovel has large loading target with the C Tournarocker's 12'5" x 8' top opening . . . speeds shovel swings, reduces spillage.

LETOURNEAU TOURNAROCKERS

PEORIA ILLINOIS

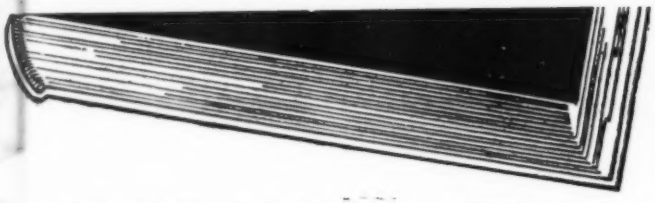
HIGH SPEED on RUBBER PLUS TRACTION ADVANTAGES of a CRAWLER



An Indispensable Tool For Both Operator and Supplier of Equipment

The pit-and-quarry industries, in providing important basic raw materials, bear a large share of the responsibility for the success of America's industrial effort. For the producer the revised Technical Section of the 1951 Handbook provides a ready answer for many of his operating problems. For the concern supplying him with the machinery and equipment necessary to produce his materials, the 1951 Directory Section provides an accurate, up-to-the-minute list of all known producers of nonmetallic minerals and their products. No effort or expense has been spared to make the new Directory an efficient and highly useful source of information about producers. The number of changes made in the 1951 edition runs into the thousands.

1951 Edition—Order Now



Directory Section listings appear two ways — (1) alphabetical by companies, (2) geographical by plants. You get company names, officers, location of plants, their capacity, and the names of the men who do the buying.

- 928 PAGES
- 27 CHAPTERS
- AUTHORITATIVE
- 15,000-NAME DIRECTORY
- COMPLETELY INDEXED

Order NOW! Use the handy coupon below.

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—copies of the 1951 Handbook and Directory bound together at $15.00
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☐ Check is enclosed
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Name .....Title .....
Company .....
City .....Zone.....State .....

July 1951

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT & QUARRY

Conversion

TO

SUPREMIX TILTING MIXER

AT THE RUPPERTS PLANT • MILWAUKEE

Another good example of SuPREMIX quick, low cost conversion was recently installed in this plant at Milwaukee . . . The unique mounting and tilting principle of the SuPREMIXER made it possible to set up an efficient central mixing operation even though there was only a limited amount of head room. This plant now is in high production turning out batch after batch of superior quality concrete, free from segregation, at lower costs.

An improved blade arrangement results in faster, better mixing with quick complete discharge of concrete free from segregation.

The streamlined, self-cleaning batcher designed for the mixer eliminates the need for a collecting hopper. Cleans completely without vibration.

SUPREMIX INC.

HERE'S WHY THEY ASK FOR 'INCOR'

Saved: $1.44 PER CU. YD. OF CONCRETE

92 Floors and Roof Slabs Concreted in 98 Working Days

● New York City Housing Authority plans and builds with a single objective—full value for every dollar—using reinforced concrete frame construction for utmost stability and fire-safety, maximum speed and economy.

General Contractor planned the 12 buildings in Section 2 of Astoria Houses to go up at the same time, but, due to unforeseen foundation conditions, went ahead with six buildings, using 'INCOR' 24-HOUR CEMENT with one set of forms for each building, then re-used these forms on the other six.

Well-engineered forms, designed in the office and built to closest tolerances, were a key factor in streamlined efficiency—erection speed equal to or exceeding that of any other type of frame erection.

First floor poured June 19, 1950 . . . last roof slab of twelfth building on November 1, 1950 . . . *80 floors and 12 roof slabs, 15,000 cu. yds. of concrete, in 98 working days . . . completed before cold weather!*

Dependable 'Incor' early stripping strength kept the job on rapid schedule, saved over 60 days. Result, $1.44 NET saving per cu. yd., over and above the 73¢ a yard extra cost of 'Incor'. Cold-weather saving was another big plus.

'Incor' economy knows no season. Right around the calendar, 'Incor'* promotes smooth-running, time-saving efficiency on which today's close-margin profits depend. One reason why so many Ready Mix Operators make 'Incor' concrete available as part of their good service.

*Reg. U. S. Pat. Off.

Forms for Astoria Houses, Section 2, designed and engineered in the office and built to closest tolerances, moved up at speed equal to or exceeding that of any other type of construction. Good job planning made fullest use of dependable 'Incor' high early strength. Result, 60 days' earlier completion—NET saving, $1.44 per cu. yd. concrete.

NEW YORK CITY HOUSING AUTHORITY
ASTORIA HOUSES—SECTION TWO
(12 Buildings), Astoria, Queens, New York City

Architects:
HARRISON, ABRAMOVITZ & WIGGINS, New York
Engineers: SEELYE STEVENSON & VALUE, New York

Ready-Mix 'Incor' Concrete:
COLONIAL SAND & STONE CO., INC., New York

General Contractors:
WILLCOX CONSTRUCTION COMPANY, Inc.
MAURICE L. BEIN, Inc. NATHAN FISH, Inc.
JAMES McHUGH SONS, Inc., Long Island City

LONE STAR CEMENTS COVER
THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 17 MODERN MILLS, 125,000,000 SACKS ANNUAL CAPACITY

NEWS OF CONCRETE MANUFACTURERS

Effective Publicity Headlines Seiffert Plant Opened at Everett, Wash.

When the H. O. Seiffert Company recently opened its new concrete plant in Everett, Wash., everybody in town knew about it. The company told the story via a full-page advertisement in the *Everett Daily Herald.*

Prominently featured were pictures of the Superior Portland Cement's facilities at Concrete, Wash., and the Glacier Sand and Gravel Company at the Steilacoom gravel pits, suppliers of cement and aggregates for Seiffert. Loaded barges of the American Tug Boat Company which transport sand and gravel from the pits to the new mixing plant, were also shown.

Other views pictured the concrete firm's new mixing facilities, with the 2,000-cu. ft. cement silo, the 200-ft. conveyor belt which transports the material from the shore to the plant, and the six other conveyors.

During the opening festivities the firm arranged supervised tours of the plant. Further publicity for the company's activities was gained by a radio tour and a special broadcast made from the plant over Station KRKO. The concern has been serving the Everett area since 1898, when deliveries were made in horse-drawn vhicles.

Kansas Red-E-Mix Concern Opens New Block Facilities

One of the newest industries of Atchison, Kan., is the Red-E-Mix Concrete Company's block plant, which recently went into full-scale production. The new facilities are housed in a structure built at the site of the firm's ready-mixed concrete plant, which is now a year old.

Most important item in the block plant is a $10,000 Lith-I-Block machine weighing three tons which turns out units at the rate of 480 per hour. An 80-hp. gas-heated steam boiler supplies steam for the three 30- by 11- by 10-ft. kilns. Gus Hillix Jr. is manager of the block plant.

H. K. Cook Heads Committee On Freezing-Thawing Tests

Herbert K. Cook, chief, Concrete Research Division, Waterways Experiment Station, Jackson, Miss., has been appointed chairman of a newly-established subcommittee on methods of testing concrete for freezing and thawing. The subcommittee will be a part of Committee C-9 on Concrete and Concrete Aggregates of the American Society for Testing Materials, and will develop standardized procedures for use in concrete testing and research laboratories.

Mr. Cook was selected to head this important new group because of his long association with the pioneer work of the Corps of Engineers in this field. In 1942 he designed the first fully automatic laboratory apparatus for testing concrete for resistance to freezing and thawing; and he has supervised the development and use of similar apparatus since that time. At present, installations of this type are in use at the Waterways Experiment Station and at other Corps of Engineers laboratories in San Francisco, Portland (Ore.), Omaha, Dallas, Atlanta, and Cincinnati.

Massachusetts Concern Celebrates 25th Anniversary

At Spring Bars, Teaticket, Mass., the Concrete Products Company recently observed the 25th anniversary of its founding. The concern turns out block, two types of cess-pool blocks, chimney blocks and units for manholes and catch basins used by the state.

Founded in 1926 by A. L. Bowman and A. R. Wood, the business was conducted by the partners until 1933, when Mr. Wood withdrew. Mr. Bowman continued to operate the plant until he was joined by a new partner, A. H. Burrough, in 1946.

The new ready-mix plant of the Phillips Concrete Company at Lebanon, Mo., is scheduled to go into operation in the immediate future. Another plant is presently being operated by the concern at Marshall, Mo. Walter Meredith is manager at Lebanon.

Lafayette Concrete Pipe Company, Inc., Lafayette, La., has opened for business in a new location about 1½ miles east of Lafayette. Thomas G. Bostic is manager.

Coming Events

October 8-12, 1951 — Chicago. 39th National Safety Congress and Exposition. Stevens, Palmer House, Congress, Morrison, and LaSalle Hotels.

November 26-27, 1951—Chicago. Convention of National Association of Silo Manufacturers. Palmer House.

February 10, 1952 (week of)—Chicago. 22nd annual convention and exhibit, National Ready Mixed Concrete Association. Stevens Hotel.

Studies in Concrete Win Eschenbrenner Awards For University Seniors

David L. Crowson, Gainesville, Fla., a senior in the engineering school at the University of Florida and Frank M. Masters Jr., Harrisburg, Pa., a senior at Lehigh University, have been named winners of Eschenbrenner Awards, sponsored by Universal Concrete Pipe Co., Columbus, O. Each will receive $500 and an engraved medallion.

The Eschenbrenner Awards were established last year "to stimulate original thinking among civil engineering students in the design, fabrication and use of concrete products."

Mr. Crowson's paper dealt with the comparative effects of hydrogen sulphide on air-entrained and plain concrete; and Mr. Masters won his award on his investigation of the effects of capping materials on the apparent strength of concrete test specimens. These two students and honorable mention winners received their awards from H. X. Eschenbrenner, Universal president.

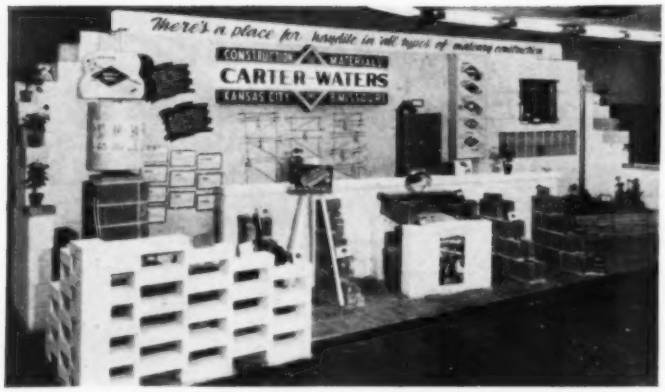
Kuhn Named to Committee To Work on A.C.I. Manual

Charles J. Kuhn, president of the Kuhn Construction Company, Charlestown, W. Va., has been named to a special committee of the American Concrete Institute. According to H. E. Foreman, managing director of the Associated General Contractors of America, Mr. Kuhn will represent the contractors' group on the committee.

Appoined by Harry F. Thomson, president of A.C.I., Mr. Kuhn will serve with a committee to review and keep up to date the institute's *Manual of Standard Practices for Detailing Reinforced Concrete.*

An attractive folder announcing the J. P. Loomis Coal & Supply Company's newest addition recently went into the mail at Akron, O. Described as "Akron's newest and most modern concrete plant", the new Supremix concrete facilities were opened to visitors on June 6 and 7. Supremix equipment is made by the Gene Olsen Corporation. The Loomis Co. also produces sand and gravel and mortar.

Lance G. Finlay, former vice-president of the Raymond Concrete Pile Company, New York, N. Y., died on April 22 in St. Petersburg, Fla., while on a vacation. Mr. Finlay, who was 75 years of age, joined the firm in 1911. In 1944 he was named vice-president and a director. Five years later he resigned from both posts.


There's a place for haydite in all types of masonry construction
CONSTRUCTION MATERIALS
CARTER-WATERS
KANSAS CITY MISSOURI

• This "constructive" exhibit of Carter-Waters Corp. building materials was one of many that drew 89,600 people to Kansas City's third post-war homes show held April 15 through 20. Haydite brick and blocks in various sizes were two of the features of this exhibit, which not only showed construction materials manufactured and distributed by Carter-Waters, but also suggested uses for these products in construction.

C. M. Manufacturers Assn. Of S. Calif. Enjoy Barbecue

Instead of their usual monthly meeting, members of the Concrete Masonry Manufacturers' Association of Southern California were treated to a memorable barbecued spare-rib dinner on the evening of May 29 by Armor Laboratories, Inc., at its Glendale, Calif., plant. A spacious warehouse wing of the plant, which manufactures "Armor Coat," waterproof paint for concrete-masonry structures, was converted into a dining room for the occasion by President W. J. Snider. More than 100 members and guests were present.

The barbecue was preceded by a cocktail hour and followed by entertainment which included some well-known Hollywood talent. Later the guests made a tour of the plant and laboratory to see how Armor Coat is manufactured and how the product is controlled. Worldwide distribution has been achieved, Mr. Snider explained, during the 20 years the company has been making the waterproof paint, and many concrete-products makers throughout the U.S.A. serve as distributors and dealers.

Secretary-Manager Clif Hendrickson reported that interest and inquiries from the association's weekly television show, *A Home to Live In*, were far in excess of expectations. The building of the all-concrete house is being televised, showing the construction step-by-step, over a 26-week period. Moderator of the show, Hal Smith, prominent radio and TV announcer, and Betty Turbiville, director, were guests at the barbecue.

Members at the meeting enthusiastically agreed to participate in a proposal advanced by the Los Angeles County Fair to erect the walls of the new Minerals Building at the fair as a promotional measure. It will involve the erection of about 3,500 sq. ft. of concrete-masonry walls in the structure, separate sections being divided by pilasters. Each section will be built from units made by different member companies, and each will carry a plaque identifying the donor's product.

Mr. Hendrickson also reported that new regulations of the Los Angeles County Building Department will henceforth require that 10 percent of the blocks going into any structure be identified with the maker's name.

Good promotional material favoring concrete masonry was offered in a report by Bruce Iliff, Long Beach member-producer. He told how a recent fire in Lancaster, Calif., threatened an entire business block in that desert community, but was fortunately confined to only the corner building, due to the fact that the adjoining structure—of concrete-masonry construction—served as a fire barrier in preventing the spread of the flames. Mr. Iliff reported that he had good photographs of the fire damage which graphically illustrate the ability of concrete-block structures to resist fire.

Missouri, Kansas Producers Hear Forrest D. Byars

Mo-Kan Concrete Products Association held an afternoon meeting on June 15 at the Hotel President, Kansas City, Mo. Guests from the concrete block industry in Missouri and Kansas were present.

The guests and a number of representatives from the newly formed Masonry Contractors' Association of Greater Kansas City Area, also attended a dinner. The guest speaker for the occasion was Forrest D. Byars, chairman of the Kansas City Public Housing Authority and also secretary of the Downtown Committee of Kansas City. His subject was *Public Housing Plans for Tomorrow*, a topic of more than passing interest in view of substantial developments expected to start soon in the Kansas City area. George W. Goelitzer, Cinder Concrete Products, Inc., is president of the Mo-Kan Concrete Products Association.

Illinois Block Maker's Home Demonstrates His Products

Pictures may be worth more than words, but the real thing is even better. This was the reasoning that led the J. H. Irions to hold open house in their new home recently. Mr. Irions, owner of the Irions Concrete Block Company at Chillicothe, Ill., and his family invited the public to view the many uses of his products in his own newly-built home.

Walls of the all-concrete structure are of Celocrete, as well as the roof and floors. Even the fireplace is made of concrete units having a terrazo effect; and the patio and outdoor fireplace are also of concrete slabs.

Plenty of newspaper publicity was given the event, an illustration of the home accompanying the invitation.

• Guests arriving at the Armor plant laboratory are greeted at the entrance.

• President W. J. Snider (right) explains the operation of a 4-spout container filler to Clif Hendrickson.

Superlite Corp. to Develop Large Deposit in Arizona—5,000,000-Ton Supply

Officials of the Superlite Corporation, associated with the Builders Supply Corporation of Phoenix, Ariz., of which it is a division, have recently signed contracts to open a completely new Superlite deposit 14 miles west of Wickenburg, Ariz.

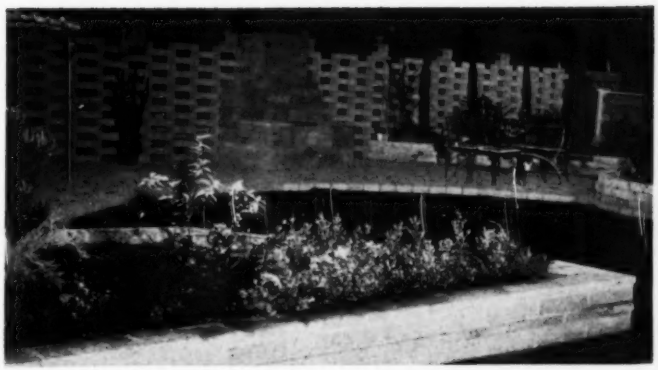
The material will be mined, crushed, and processed for shipment to Phoenix, and also to plants in California. The Fisher Contracting Company of Phoenix (roadbuilders and sand-rock producers) will mine and process the ore for Superlite, whose plant will have a capacity of 20 carloads per day. It is said that the firm has a visible supply of more than 5,000,000 tons of material, which will be known as Superlite Aggregates. Officers are Paul M. Thomas, president; Roger Thomas, vice-president and secretary; and Gilbert Olson, treasurer.

The firm is working deposits in California, Arizona, and New Mexico.

L. E. Shaw Given High Honor By Y.M.C.A. Natl. Council

Lloyd E. Shaw, president of L. E. Shaw Ltd., manufacturers of concrete products at Halifax, Nova Scotia, was recently honored at a ceremony in that city and was formally presented with an honorary life membership in the Y. M. C. A. The presentation was made by the national council of the organization "in recognition and grateful appreciation of devoted Christian service rendered to youth through the National Council of the Y. M. C. A.s of Canada."

Mr. Shaw operates plants for the manufacture of concrete water and sewerage pipe, culverts, and block and brick in Halifax and St. John, New Brunswick.



• Featured by the Atlas Building Products Company at the El Paso Garden Clubs Show recently was this display, viewed by approximately 6,500 persons. The firm, which produces Hycal (hydrated lime) stucco, Sacrete, and cinder-concrete block, also entered an exhibit in the El Paso Annual Home Builders Show. Both displays featured the theme of outdoor living.

J. A. Griffin, credit manager of Vang Ready-Mix Concrete Company and Iron City Sand & Gravel Corporation, Pittsburgh, Pa., died on May 20 at a hospital at Aspinwall, Pa. Mr. Griffin was 69 years of age.

Roy Powell has been appointed sales manager of Anchor Concrete Products, Inc., Buffalo, N. Y., according to President Frederick W. Reinhold.

Super Concrete's President, E. S. Simpson, Dies in Capital

Edmund Sewall Simpson, president of the Super Concrete Company, Washington, D. C., died on April 10 in that city.

A native of Fort Wayne, Ind., Mr. Simpson was at one time associated with the Chesapeake and Potomac Railroad. Subsequently he served as president of the West Virginia Coal Company. In 1929 he came to Washington from Richmond, Va., to become the president of Super Concrete Company.

Big Mixer Lies Down on Job—Resumes Work Unharmed

The sturdiness of modern equipment was strikingly illustrated the other day at Pomona, Calif., when a careless truck driver backed one of Azusa Rock & Sand Company's 5-cu. yd. Challenge truck mixers off a bank and over on its side. After the big unit had been righted, inspection showed that it had suffered no damage, and before many hours had passed, Unit No. 218 was back in service.

The accompanying pictures, taken on the same day, show (1) the big Challenge machine lying on its side following the mishap and (2) again on the job later in the day, a slight dent in the instrument panel just below the water tank being the only evidence, visible or otherwise, that it had toppled over.

N. B. The truck driver, an accident-prone individual, was discharged.

Below, left: Azusa Rock and Sand Company's mixer in an unusual pose. Right: Back to normal and ready to go.

$70,000 Fire on Sunday, Back to Work on Monday

The Calumet Flexicore Corp. of Gary, Ind., which was hit by a $70,000 fire early on May 13, was back in production of concrete building slabs on May 14. Eugene M. Swenson, one of the corporation owners, said that electricians had worked throughout the 13th repairing wiring damaged by the intense heat so that production in undamaged portions of the plant could be resumed.

Origin of the fire, according to Mr. Swenson, was believed to have been a leak in an acetylene tank. Two workmen in the plant at the time the fire started said that an explosion had been followed by flames which enveloped the entire building.

Automatic Equipment Modernizes Nebraska Products Plant

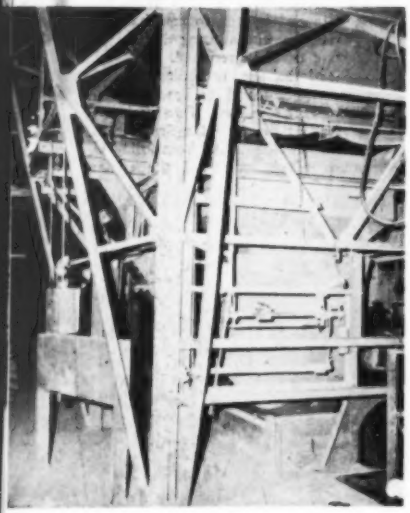
By WALTER E. TRAUFFER

• The Fremont, Neb., plant of the Platte Valley Cement Tile Mfg. Co. The tractor at the left is stockpiling aggregates for the ready-mixed concrete department. The cement elevator (background) serves all operations.

THE Fremont, Nebraska, plant of the Platte Valley Cement Tile Manufacturing Company has an interesting history dating back to 1909. An important chapter in this history was the installation in March, 1950, of one of the first of the new Stearns Model 50 two-at-a-time block machines (it carries Serial No. 2), complete with mixer, automatic pallet return and washer, magnetic offbearer, etc. As is the case with all such installations, some months were spent in getting minor bugs out of the machine and adjusting all phases of the operation to get the maximum output of quality blocks. There has been no hurry about doing this in this particular installation, as the demand in this area has not yet required its full capacity. This machine was averaging 400 standard 8- by 8- by 16-in. blocks per hour when the plant was visited late last fall.

The company was formed in 1909 when George F. Lillie built a plant at North Bend, Neb., for the manufacture of concrete drain tile. A few years later he built a similar plant at Fremont, and a 1915 advertisement from a local newspaper which accompanies this article indicates that this was a modern plant in its day. Fremont then had a population considerably smaller than its present 17,000 inhabitants, but its tributary farming and stock-raising area has grown even more rapidly, and the plant has kept pace with it. Concrete pipe was added to its products many years ago, and concrete block and ready-mixed concrete in 1936. The complete list of products made there now includes drain tile, 4- to 84-in. diameter sewer and culvert pipe, concrete blocks, ready-mixed concrete, and well tile and curbing. The pipe over 30 in. in dia. is cast in the yard; all others are machine made. All products are made to state, city, and A. S. T. M. specifications.

• The weigh batcher which feeds cement and aggregates to the 28-cu. ft. ready-mix plant mixer.



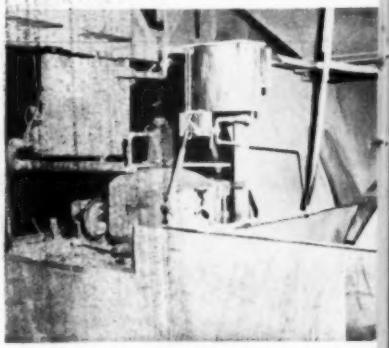
At its Scottsbluff, Nebr., plant which was built in 1941, the company makes all these products and also corrugated metal culverts. Sand and gravel is also produced and sold. The Clipper stripper block machine came from the Fremont plant. A temporary plant at Holdredge, Nebr., is operated as a joint venture with the Lock Joint Pipe Co. Only irrigation pipe is made at that plant.

George F. Lillie Sr. died in 1939. His two sons then bought out all other interests and formed a partnership. George Lillie is president and operates the Scottsbluff plant. Wallace Lillie is secretary-treasurer and operates the Fremont plant, with L. E. Hauser as superintendent.

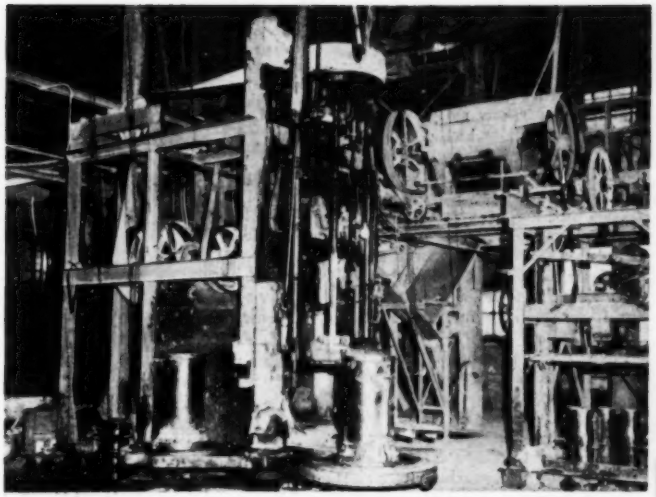
The Fremont plant is a one-story reinforced concrete and concrete-block structure with a mezzanine for the batching equipment. It is a straight-line setup for efficiency, with the ready-mixed concrete department at the end toward the access road, then the three concrete pipe machines and the concrete block machine, with the curing rooms at the other or yard end. There is no heating problem in cold weather, as the curing rooms inside the building at one end and a space heater at the other end maintain a comfortable working temperature. Ventilating fans keep the plant cool in summer.

The scarcity of coarse aggregates in the state of Nebraska is responsible for the specifications which make it necessary to store only two grades of blended aggregates for all the products made. These are hauled in by truck from a local pit. The con-

• The three dispensers alongside the batcher, which discharge admixtures into the ready-mixed concrete mixer.



• The traveling weigh batcher which discharges cement and aggregates into the mixers for the pipe and block machines.



• Two of the three concrete pipe machines with track-mounted mixer above, which serves them all.

crete aggregate for ready-mixed concrete is blended to state specifications with 100 percent passing through 1-in., 10 to 55 percent through 4-mesh, and 75 percent through 30-mesh. The concrete block sand has 30 to 42 percent retained on a 4-mesh screen. For concrete pipe a 50-50 blend of the two aggregates is used.

The concrete aggregate is dumped from trucks into piles and is then bulldozed into a walled enclosure at the end of the plant, total storage capacity being 4,000 cu. yd. A hole in the plant wall of the enclosure allows gravity feed to a hopper from which a bucket elevator feeds into one compartment of the 2-compartment, 90-cu. yd. plant bin.

Bulk cement is used exclusively and this is discharged from railroad cars into a track hopper from which a screw conveyor and bucket elevator feed it into a 2,200-bbl. Erie bin complete with batchers, etc. This installation was made in 1950. The cement feed into the batcher is automatic, a mercury switch on the beam scale stopping the cement screw at the desired weight. The aggregate is fed into the batcher through lever-operated clamshell gates. The batch is discharged into the 285 Concrete Machinery Corp. plant mixer along with water from a C.M.C. volume-measuring tank. The mixer is equipped with a timer for state highway work.

In cold weather both water and aggregates are heated with steam, and the use of calcium chloride makes hauls of up to 50 mi. possible. Darex, Pozzolith and Protex admixtures are also used and are fed from individual dispensers. The ready-mix truck fleet consists of three 4-cu. yd. and two 5-cu. yd. Dumpcretes. Three 3-cu. yd. dump trucks with tight doors are also used. Most of the concrete goes to farmers for silo bases, feeding floors, driveways, etc., and some is used on state and city projects.

The block sand is dumped from the trucks into a stockpile or direct to a hopper, from which the same bucket elevator feeds to the second compartment of the plant bin.

Under the bin is a traveling weigh batcher or larry with beam scales which is suspended from a Louden monorail. Both the pipe and block machine mixers are served by the monorail. Cement is discharged into this batcher from the Erie bin through a Blaw-Knox cement valve and a chute.

Batches for the three Zeidler pipe machines are discharged into a 25-

• The advertisement which showed activities at the Fremont plant in 1915.

cu. ft. Stearns mixer which is mounted on a track and is positioned over each machine as needed. The first pipe machine makes 30-in. pipe in any length up to 4 ft. The second machine makes sewer pipe in 4-, 6-, 8- and 10-in. diameters and 3 ft. in length. The third machine makes 1-ft. drain tile in 5- to 12-in. diameters.

The pipe are transferred from the machines onto skids and handled by fork-lift trucks to the curing rooms and later to the yard. A forming roll and a P&H electric welder are used for forming the wire pipe-reinforcing cages.

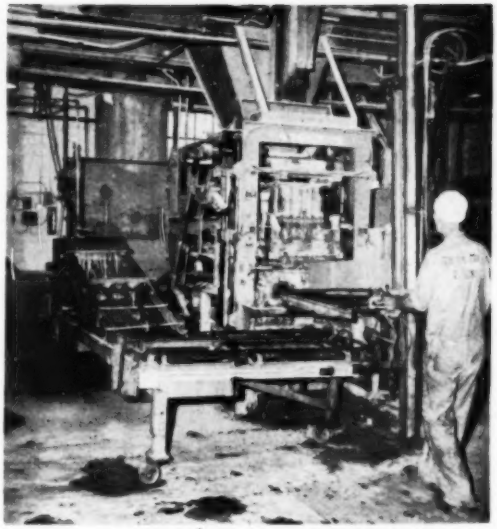
The traveling weigh larry discharges batches for concrete block manufacture into the 30-cu. ft. Stearns mixer over the Stearns block machine. This new Model 50 machine is a 2-at-a-time automatic machine with all attachments, as has already been stated. The offbearer is magnetic, picking up an empty pallet each time it deposits a loaded one on a rack. The returned pallet is automatically washed and deposited in the pallet feeder. All standard sizes and types of blocks are made, as well as sides for corn cribs and a few other specials.

This plant has 75 block racks holding 80 standard blocks each. An Erickson fork-lift truck takes the loaded racks to the curing rooms, each of which is 9 by 23 ft. These rooms are of concrete and block construction, open at one end, are are equipped with Uni-Temp aluminum doors and a Minneapolis-Honeywell control system using 15-lb. steam from a boiler. Steam is kept on for 5 hours at a temperature of 140 to 145 deg. F. Each room will hold nine racks of blocks, and together they will hold a day's output of pipes and blocks.

• Right: The lift truck loading cubed blocks on a trailer truck which is carrying a mixed load of blocks and pipe. (Note steel strapping.)

• Below: The manner in which steel strapping is used to secure a load of blocks on the trailer.

• The new type of automatic block machine, with mixer, magnetic offbearer, automatic pallet return, and washer.



Erickson lift trucks carry the cured blocks and small pipe to the 200- by 800-ft. storage yard, which is partly paved. Two Wagner Scoopmobiles are used to handle the larger pipe three at a time into piles. The blocks are cubed under a 33- by 80-ft. shed which makes operation possible even in bad weather. The cubed blocks are then stacked 15 ft. high in the yard. The same lift trucks rehandle the cubed blocks to trucks for delivery.

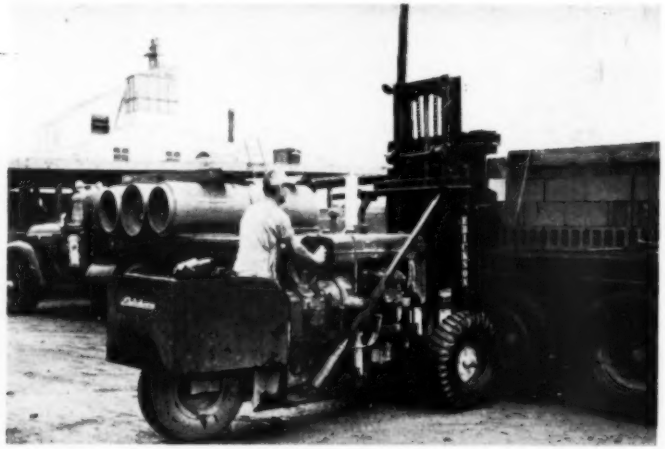
Both pipes and blocks are delivered mostly on company-owned flat-bed trucks, three $1\frac{1}{2}$-ton units and two recent-model International flat-bed tractor trailers which will each carry 800 standard 8-in. blocks. In order to prevent shifting of the block or pipe loads on these trailers in transit, loads are bound with six bands of Signode steel strapping. Wooden corners are used to protect the blocks, and a Signode banding machine tightens and locks the bands. This strapping makes it possible to haul a bigger load safely at any speed.

Defense and Military Needs Demand Plant Expansion

Production was started at the new West Coast plant of Superior Concrete Accessories, Inc., in San Leandro, Calif., on June 1. Output at the new building on Williams Street is now double that which was possible at the firm's former quarters.

Expansion was made necessary by the increasing requirements for armed services and defense manufacturing. Superior also operates a plant in Chicago. L. N. Umbach is president of the firm. H. G. Ballou is in charge of Pacific Coast activities.

C. Ray Wilhelm, manager of the Universal Concrete Pipe Company's plant at Atlanta, Ga., was recently elected president of the Georgia Concrete Pipe Association.



NEED MONEY?

How will you mend your financial fences? Consider your banker's counsel —

another P-Q exclusive

JOHNNY JONES owned a small concrete products plant in the Northwest. It had been a going business for fourteen years, until Johnny made one mistake. He drained himself of liquid capital in order to latch onto an attractive proposition. As a result another failure was added to the long list of recent business bankruptcies.

Johnny regards Pete Brown over in the next county as a fortunate man, because Brown took advantage of the same apparently glittering opportunity which sucked up all of Jones's cash—and survived. But Brown was wiser in the ways of finance, and instead of spending all he had in the bank, he borrowed, and had enough liquid capital for normal business needs.

Getting extra capital isn't nearly as difficult as many business men imagine it to be. There are two main ways in which funds can flow to the man who needs money (but whose business is basically sound)—loans and venture capital.

"The trouble," one banker said recently, "is that, while most business men with any experience at all are aware of the fact that capital can be secured when needed, they just don't know how to go about it—or the fact that thousands of dollars can sometimes be raised in minutes when you are hep to the workings of the money mill."

Which is best, venture money or a loan? One operator whose name may as well be disguised as Joe Blow, pondered that question recently. He needed substantial sums in order to finance an expansion and purchase new equipment. He was fortunate in having a close friend who was executive vice-president of the largest local bank. One day at lunch, Joe Blow put his problem cards face up on the restaurant table.

"What do you think, Jim?" he asked his banker friend. "Should I take in a partner with a big bank roll, sell stock, or mortgage everything I own to borrow the money? It's a wonderful opportunity I wouldn't want to miss. In a couple of years, we can earn double, maybe triple, today's profits."

By DAVID MARKSTEIN

"You are making a mistake in basic financial thinking that plenty of other business men make," the banker said. "You want to get all of it in one hunk, from one source. That's not particularly smart —or even practical.

"Look at it this way: How much of the money do you wish to keep in the business permanently, and how much do you wish to pay back?

"Offhand, without knowing all of the workings of your company, I would guess that the money you need to expand in a big way should come from additional permanent capital. Venture money, in other words. And that the funds for equipment should be borrowed on long-term notes.

"Generally speaking, loans are for improvement, capital needs, tiding-over, and sometimes for major investments of what you might call a minor nature. But if big money is needed on a permanent basis, then it is often wisest to get a partner with enough dough to provide it, or else attract venture capital by incorporation and the selling of stock shares.

"Now, mind you, many other things enter into the decision. That is why I can't say this course or that course would be the thing for you to do. For example, a factor is your own willingness to sacrifice a part of your ownership to a partner or stockholders. So is taxation. An individually owned business has to do a lot of business before it reaches the tax brackets that corporations begin in.

"But as a rule of thumb, remember that you wouldn't make a ninety-day note if you wanted to expand—it would take either a long-term loan, or else venture capital, depending upon circumstances. By the same rule of thumb, no business man wise in the ways of finance would sell stock in a company simply in order to get temporary money to take advantage of a passing opportunity."

• Getting a banker's-eye view of the problem.

There are many ways and places to borrow money. In deciding where and how to make a loan, the important considerations are *why* you want to borrow, *on what* you want to borrow, and for *how long*.

The two principal sources of business loans are banks and the Reconstruction Finance Corporation. Both want to know those three facts when you approach them for money.

They will also want to have data about your business—a profit-and-loss statement. This is to give the lender a chance to determine how good a business man you are.

He must make pretty sure that you are a smart operator who can parlay the money he lends into sufficient size to enable you to repay the loan and still show a profit on your business books.

The banker will likewise investigate your past paying record. How you have paid your debts in the past is a good indicator of whether you will do so again. So be prepared with the facts about past loans. Most of these he can get as routine credit information through his regular channels. But some may be missed, unless you call it to his attention.

On what do banks and the RFC lend money? In almost every case, there must be security of some sort. Occasionally, an account with an excellent payment record gets a loan on signature only. But this is rare; and when it happens, the loan is nearly always for a relatively small amount.

Banks lend money on the following securities:

Inventory—The stock in a warehouse is excellent security. If a short-term loan is needed, and the inventory can rest in a warehouse for a few months, then bonded warehouse receipts offer collateral which most lenders will welcome.

Buildings and Real Estate—A mortgage loan is one of the easiest to arrange, provided the property is not encumbered with previous unpaid mortgages or liens.

Equipment — Chattel mortgage loans, of either long or short term, can be made quickly when the borrower puts up equipment for security. "Pledging" the equipment does not mean you can't use it. It remains in your possession, but you cannot sell it while the loan remains unpaid—unless the banker says okay.

Accounts receivable—"The business man who carries his own credit is a fool—unless he has a truly sizable operation, with a sizable amount of liquid capital," a banker told a Western credit convention recently. To prove his point, he cited the case of one minerals producer who wound up with the bankruptcy lawyers less than a year after he decided to "save" the discount money he had been paying a bank to buy his accounts receivable.

"Roughly $1,000 became tied up in accounts receivable every month," this banker told his audience. "Counting the payments which began to roll in, he found at the end of a year that $6,000 was socked away in accounts receivable. His original working capital was not much in excess of this. He faced absolute bankruptcy.

"But fortunately, there is a happy ending. His lawyer decided that the business might yet be saved, and brought him to us. As the lawyer later told me, the business was really sound, and so were most of the accounts receivable. Would we extend a loan? We did. Today, the operator brings his accounts to us, and we discount them. He has learned that it is foolish to try making money out of money unless you are in that business. He leaves the banking to the bankers."

The most popular method of raising quick funds on accounts receivable is to sell them outright to a bank or to a commercial finance house. The lender will discount the paper by a certain percentage, which depends upon the kind of paper and the prevailing interest rates for such lending in the local community.

In some instances the bank or finance house will take over the whole credit operation. In others (and this must be arranged individually between producer and bank) the lender advances the money, but leaves control in the borrower's hands. In other words, he still collects from his customers just as if he were carrying the credit with his own capital.

Two other common kinds of bank loans are with co-signers, and with insurance policies as collateral. Neither is very useful for long-term loans running into large amounts. But plant operators frequently use both to raise smaller sums for month-to-month expenses.

Permanent money is needed for many purposes. It can be raised in two ways: by taking in a partner, or partners; and by incorporating (if the business is a single ownership) or issuing new stock (if it is a corporation).

How does a concrete products manufacturer go about finding a well-heeled partner? The Business Opportunity classified cloumns of most big city newspapers are filled every week with the advertisements of people who want to invest money. Failing to contact a big bank roll that way, it is entirely legitimate to advertise for a partner with the necessary capital. (Most operators who do this protect their identities by using box numbers instead of flaunting their need for money in the advertising columns.) In many cities there are business brokers whose function it is to bring the man with money into contact with the man who needs money.

Before entering any partnership agreement, however, it is wise to heed the words of an attorney: "One of the quickest ways to get sucked into a confidence trap is to take in the first partner who presents himself with what appears to be a big wad of money for investing. The reason for this is an angle of law which businessmen sometimes overlook. It provides that each partner is responsible for *all* of the debts of the business. In other words, say that A takes B as a partner to get B's money into the business. Before B's wad can be put into the company coffers, B might run up a tremendous string of business debts and then blow town, with his wad still intact."

In some forms of partnership, this liability is limited. Each partner is liable only up to a certain amount. The partnership laws of the states are not uniform. The best course is to consult a lawyer.

The second way to attract venture capital is to incorporate and sell stock shares. Stockholders are not like partners; they are liable only up to the value of the stock they own. A corporation is legally an individual —a synthetic person who exists in the eyes of the law, but who cannot breathe, vote, eat, or do the things which regular human beings do. The corporation is owned by its stockholders. In turn, it owns assets. These are corporate property. They do not belong to any stockholder.

One advantage of an incorporation is that it is easier to retain control of a corporation, through keeping back 51 percent of the stock, than it is to keep the running of a partnership in one individual's hands.

However, it costs money to incorporate. Furthermore, corporation taxes are higher than those levied on individuals, and the earnings are doubly taxed, since the disbursed profits paid out as dividends count as individual income for the stockholders. Any small operator can prepare his own income tax statement, but it takes a skilled tax lawyer or tax accountant to unravel the complexities of a corporation's tax return.

Another Mixer Accident Kills One—Maims Co-worker

One man was fatally injured and another lost both feet in an accident at the Tampa Sand and Material Company's block plant in Tampa, Fla., recently. Greenberry Canada was killed and Albert Mingo lost both feet when the mechanism of a concrete mixer which they were cleaning was accidentally started.

The men had just entered the mixer when a workman who was new on the job pressed the starter button by mistake, intending to raise a rope and bucket from the bottom of the mixer. The screams of the victims so unnerved him that he could not stop the machinery immediately.

Weighty Door Prizes Given At Block Plant Opening

One lucky guest at the grand opening of the Blue Lake Block Company, Hopkinsville, Ky., won $50 worth of concrete blocks; another a set of Homeward Steps (precast concrete); a third a 50-lb can of Peerless cement paint and a fourth a barrel of masonry cement. These items were the door prizes at the "open house" held at the new plant on April 5.

Only concrete block is made in the Hopkinsville plant, although the parent company, the Russellville (Ky.) Concrete Products Company, produces precast concrete steps, burial vaults, and other concrete products. Partners in the two-plant concern are Hal and Brents Thurmond. At the Blue Lake plant Lanice Futrell will serve as superintendent.

Reported doing a rushing pre-mix business at Othello, Wash., (250-300 cu. yd. per day) is the Othello Cement Products plant, which was opened a few weeks ago. The outfit is being operated in conjunction with a crushing and screening plant north of the city and was built by Ellensburg Cement Products. Don Hanks, head of that company, is supervising operations at Othello.

Lightweight Concrete Developments

By O. TELLEFSEN
General manager, Tellefsen-Hill Perlite Concrete Corporation, La Jolla, Calif.

ABOUT a year ago the National Bureau of Standards made a series of tests of various lightweight concrete aggregates. Those tests were conducted at the request of the Federal Housing and Home Finance Agency, ". . . for the purpose of obtaining necessary engineering data for studies concerned with the manner and extent to which light aggregate concretes may be useful in the present housing program."

This was indeed an important assignment. It is doubtful that the Bureau of Standards realized just how important.

In the first place, the Federal Housing and Home Finance Agency wished to find out definitely if there were any chance of using lightweight concrete in the present housing program, also to get data by which concrete suggested by the trade could be evaluated. It is assumed that this was the purpose; otherwise there would be no reason for the request.

In the second place, inasmuch as the tests with explanations and comments have been printed in official information circular form and reprinted in several trade journals, this series of tests has emerged as an outstanding authority on lightweight concrete.

The importance of the tests is therefore obvious. If they constitute complete and accurate information on lightweight concretes, they may be termed a blessing for all concerned. If the opposite be the case, then everybody has been led out in the big, wild woods.

Let us therefore see what is actually known about lightweight concrete by people working in the trade, and then compare this with the findings of the Bureau of Standards. It is assumed that people interested in lightweight concrete are familiar with the tests and comments in question, so it should be needless to print them here.

Three Basic Forms of Light Aggregate Concrete

Some of the light aggregates are relatively new and have not yet had time to find out where and how they can make the most valuable contribution to specialized concrete. It is a simple matter to mix any of the aggregates with cement to make the kind of concrete which is characteristic of that aggregate. This is the simplest and most elementary form of light aggregate concrete. Such concrete may have certain outstandingly attractive properties, generally also some very undesirable ones. No aggregate, heavy or light, is endowed with purely desirable properties.

The craft, or it may be called "the science", of practical lightweight concrete making is the selection of counterbalancing aggregates and devising means and processes by which necessary degrees of the desirable properties can be retained and the undesirable ones eliminated or decreased. It is not a simple undertaking, nor one to be completed in a short space of time. Years are required in order to ascertain how a given concrete will react.

Three different forms of procedure are open for pursuing the development of specialized light aggregate concrete. They are: the elementary form, in which concrete is made with a single aggregate; the light extender form, in which any light, coarse aggregate is added to a matrix made with sand or similar hard, fine aggregate; the light matrix form, in which the matrix is made with one of the very light fine aggregates, and the extender consists of stronger coarse aggregate for added strength and for economy.

When it is considered that we have a dozen or so available aggregates, the possible combinations are almost unlimited. Some aggregates are influenced by water, and some by chemical compositions in the cement; so the study eventually becomes a highly complex one involving not only mechanical but also chemical principles.

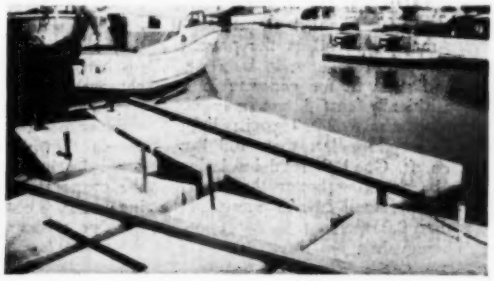
Manufacturers of specialties made with light aggregate concrete can testify and prove by actual successful and competitive products that great strides have been made in making and understanding the material.

Now let us take a look at the tests made by the Bureau of Standards. The tests were made with the simple or elementary form of concrete in which only one single aggregate is used. No means were applied to alter the natural characteristics of the concrete made with the different aggregates, so nothing but the true, natural characteristics resulted. The two more complex forms of light aggregate concrete were not even mentioned.

Yet explanations and comments printed with the tests point out the limitations of the various concretes as opposed to the desirable properties and sum up the general results as follows: "To achieve lightness and good heat insulation value, it is necessary to tolerate a relatively low strength, high absorption, and large shrinkage since light weight, good thermal insulation, high strength, and small shrinkage cannot be attained in a single concrete".

• Yacht landing at the Vallejo Yacht Club, Vallejo, Calif., supported on pontoons of perlite concrete.

• Pontoons of perlite concrete ready for installation under the yacht landing at Alameda, Calif.



• Small housing units monolithically cast of perlite concrete—built in 1947.

This summary is correct enough in respect to concretes of the first or elementary form, and there can be no question but that the Bureau of Standards was in its good right making it, because the intention was to test concretes made with the various aggregates to form a basis for further studies. It is understood in that way by people fully familiar with the subject.

But, as it has turned out, the various comments, including the above quotation, are more generally understood to mean *all* forms of lightweight concrete. There is nothing to indicate that it should be understood in any other way. It leaves quite obviously successful lightweight concrete developments out in the cold and non-existent, and that is not much of a compliment to the developers, or boost to the industry.

Here it should be prudent to pause and examine the matter from a purely realistic angle.

First, one may ask the question: "What is meant by light weight, good thermal insulation, high strength, and small shrinkage?"

A guide to the measure or value of the adjectives can be deduced from the fact that the tests were made for the Housing and Home Finance Agency to facilitate studies concerned with the manner and extent to which light aggregate concrete may be useful in the present housing program.

Good strength for concrete in a monolithically cast house may be anything above 2,000 p.s.i.; light weight anything less than 100 lbs. per cu. ft. Good thermal insulation may be anything better than a K factor of 3; small shrinkage anything less than 0.05 percent.

These values are attainable in a single concrete although not yet in one of the *elementary,* single aggregate forms of concretes. But why bar a concrete because it contains more than one aggregate?

In all candor one may now ask: "Would the Bureau of Standards knowingly withhold important information from the Housing and Home Finance Agency?" Certainly not. Specialized forms of concrete are developed by individuals and firms engaged in the trade for profit. Any improvement or development is considered a trade secret and is generally guarded with the greatest care. It is doubtful that any developer with a worthwhile process for a good lightweight concrete would have furnished it to the Bureau of Standards without adequate compensation, so there was no important information to withhold.

Perlite Concrete

In order to show what a slow process it is to develop a complex lightweight concrete it may be interesting to follow the evolution of one.

This writer became interested in expanded perlite as long ago as in 1942, at a time when the material was not even on the market. One was lucky to obtain a sack or two once in a while from experimental furnaces, and the quality was often haphazard. Yet the possibilities of the material as to light weight and high thermal insulation value left nothing to be desired.

It was soon understood, however, that if expanded perlite were ever to become an accepted concrete aggregate, its sharp drying shrinkage would have to be overcome.

Experimentation with small, hollow vessels showed that the shrinkage could be influenced by controlling the evaporation of the surplus mixing water. This could be done in a number of ways, so the problem of the shrinkage was not a hopeless one.

The most obvious and the simplest method of preventing evaporation was to keep the vessels under water. Several such vessels were kept under water for more than two years, and it was found that the setting of the cement went on in a satisfactory manner. When finally taken out and left to dry, one vessel cracked from warping rather than from shrinkage. Another showed no sign of either warping or shrinkage. Comparing data on the mixes led to some important discoveries.

By 1945 several new furnaces had come into operation, and perlite had become more plentiful. Markets had been found in the dry insulation field and in the plastering industry, also to some extent in the fields of filtration and soil conditioning. However, the sharp drying shrinkage and low strength defied its use for concrete.

Then, more as a means of closer study of the material in actual service than as a business venture, several small pontoons of pure perlite concrete were introduced by us. It had already been established that the part immersed in water would not dry out and shrink. Time and growing familiarity with the material were depended upon to solve the problem of the upper part.

The following year progress had been made in that respect, and manufacturing was started on a considerable scale. These pontoons were the first successful and highly competitive articles to be made of perlite concrete. From a feeble beginning in 1945, more than 3,000 units have been made to date, and they are all in very satisfactory service supporting floating mooring slips for yacht clubs, boat landings, and municipal landing floats from San Diego to San Francisco.

A pontoon 4 ft. by 8 ft. by 16 in. deep with 2-in. sides and a 2½-in. bottom and top weighs less than 800 lbs. and supports a net load of 1,600 lbs. If it were made of regular hard aggregate concrete, it would weigh 2,000 lbs. and support less than 400 lbs., a superiority of 4 to 1 for perlite concrete.

The pontoons do not quite hold the full 2- and 2½-in. as given above; so in reality they contain only about 15 cu. ft. of material. Density of the mix runs between 50 and 55 lbs. per cu. ft. Compression strength is held down to between 700 and 800 p.s.i. in order to increase the ratio between tensile strength and crushing strength. This increases compressibility and resiliency. It has been found time and again that pontoons of regular hard aggregate concrete, which may have a crush-

ing strength of more than 5,000 p.s.i, cannot take the severe bumping, jarring, and twisting without considerable increase in thickness and reinforcement. This leads to the conclusion that the value of compression strength in lightweight concrete is greatly overemphasized.

The following are the results of tests run on five perlite blocks by the San Diego Testing Laboratory, of San Diego, Calif., in October, 1948. Block No. 3 was the usual pontoon body mix; No. 4 is the mix for the cover; No. 1 was for the type of mix used in resilient concrete floors; the others were used for various purposes.

No.	Dimensions (Inches)	Area	Load (Lbs.)	P.S.I.	Wt./Cu. Ft.
1	4.95 x 4.90 x 10.0	24.26	32,000	1320	78.3 lbs.
2	4.93 x 4.85 x 9.9	23.91	25,500	1065	73.0 lbs.
3	4.80 x 4.70 x 10.0	22.56	18,500	820	55.5 lbs.
4	4.75 x 4.75 x 9.9	22.56	16,500	730	50.3 lbs.
5	4.92 x 4.85 x 9.9	23.86	19,500	815	69.5 lbs.

Another paradox come to light in the development of pontoons of perlite concrete is the matter of water absorption. Perlite aggregate absorbs a great deal of water, and so does perlite concrete if wrongly made. The mix for pontoon castings is so dense that evaporation can take place from the surface only, creating minute pores ⅛- to ¼-in. deep. Upon immersion in water the porous surface swells, closing the pores so that no more water can penetrate. The action is much like soaking a bag of canvas to make it hold water.

It should be noted that even in the elementary form of lightweight concrete it is possible in some instances by special processes to influence the shrinkage and reduce it to a practical minimum.

Houses of Perlite Concrete

We have seen how pontoons of perlite concrete excel out of all proportions in comparison to pontoons of regular hard aggregate concrete. In pontoons the weight is the predominant factor. In houses we are looking for insulation. When it is considered that expanded perlite possesses the highest thermal insulation value of any aggregate, one may expect that houses of perlite concrete will excel in that respect in like proportion. In this we shall not be disappointed.

At the time of the Hiroshima and Nagasaki atom bombings this writer had considerable experience with expanded perlite and its possibilities in the insulation field. It was apparent that in the future strong, completely fireproof and well insulated homes and buildings would be in demand; and perlite seemed to be the material which could meet the challenge.

Renewed efforts were made to hold the shrinkage to a minimum while stronger aggregates were added to give necessary strength. Several house walls were constructed to test and adjust the theories evolved. One wall was kept for two years exposed to winter rain and summer sun, and by the time all the interior moisture had disappeared, the shrinkage was hardly measurable.

For the purpose of further testing and trying the theories and processes, a couple of small houses were built during the late summer of 1947. It was decided to build two houses a couple of months apart to give one late summer curing conditions and the other late fall. They were built within the city limits of San Diego, Calif., designed in conformity with the Uniform Building Code, and approved by the building inspector.

The concrete used was of the third or light matrix form with a stronger coarse aggregate added for strength and economy. Test specimens average 2,200 p.s.i at 45 days and had a weight of 78 lbs. per cu. ft. They were not tested for thermal insulation value; but that factor can be judged by the following: The owner of the houses told a group of visitors a couple of months ago that last year during a severe hot spell the houses stayed cool, and neighbors came over to sit in them for a while to cool off because they were suffering in their own homes.

In conformity with the desire to make the houses completely fireproof they were cast monolithically throughout—floor slabs, walls, partitions, and roof slabs. Windows had steel sash, and only the front and back doors were of wood. All surfaces were roughed up, and the interior was plastered with tinted plaster, the exterior stuccoed.

Now after two and a half years the concrete has proved itself. Only a few minor cracks have appeared, but no more than what could be expected if the structures had been of hard aggregate concrete. The important thing to note is that the majority of the walls have no cracks or sign of shrinkage whatsoever. This means that the shrinkage can be eliminated completely. It would be too much to expect that the first attempt should turn out 100 percent perfect.

Construction cost compares favorably with that of frame and stucco houses. If a series of like houses could be built, using the forms over and over, the cost would be still lower. Strength, durability, insulation, and safety would be several times greater than in frame and stucco houses.

We see thus that all the essential characteristics of a good lightweight concrete is attainable in a single concrete. The houses are there to see and examine, so no further proof should be needed.

• Duck blinds of perlite concrete with inside diameter (bottom) of 44 in. and (top) 28 in.; inside height, 48 in.; weight, 500 lbs.

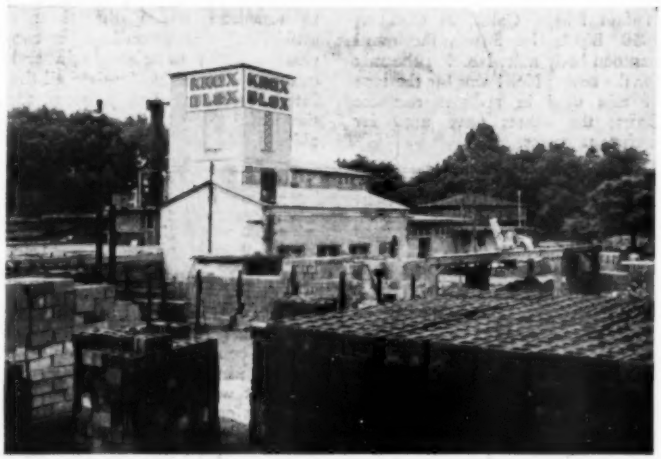
Try, Try Again Persistence Cuts Steam Demand For Curing by 75 Percent

By WILLIAM M. AVERY

another ON THE SPOT report

ONE of the busiest concrete products establishments we have visited in some time is the highly efficient plant operated by Knox Concrete Products, Inc., at Knoxville, Tennessee. Organized in 1943 primarily to supply concrete masonry units for the Oak Ridge atomic bomb development, the company has since the completion of that major project found a steady demand for two-shift production on a modern, high-capacity block machine, and has in addition developed markets for a wide variety of related concrete products. Present output of the plant includes, in addition to 65 different sizes and shapes of masonry units, such items as special weatherboard block, two sizes of precast septic tanks, Dox plank, stair treads and risers, lintels, 2-in. solid patio units, drain tile, silo blocks of their own design, outdoor picnic tables, and various types and sizes of slabs.

Batching, mixing, operation of the block machine, and handling of the units after they are molded are done for the most part in conventional ways and with conventional equipment. This company has, however, quite an interesting story to tell in regard to curing. In initial, around-the-clock operations, which were carried on under considerable pressure, it was necessary to fall back upon a short curing cycle in order to meet production schedules. Although the results were acceptable, the company felt that its entire merchandising effort would be on a sounder basis if more thoroughly cured blocks could be produced.



A general view of the Knox Concrete Products plant at Knoxville, Tenn.

As soon as possible after the war additional kilns were built and a new steam-generating unit was installed. Completion of this program gave the plant seven kilns with a total capacity of 14,400 equivalent 8-in. units—or enough to accommodate simultaneously all the units which could be produced in two 8-hr. shifts. A cycle of curing was established which called for a steady rise in temperature to about 170 deg. F. An attempt was made by manual means to hold the temperature at this level for several hours, and then all steam was cut off during a soaking period of about 18-hr. duration.

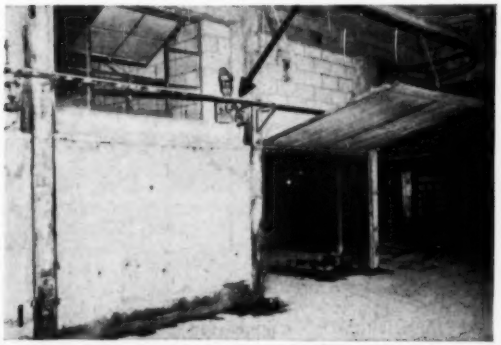
This full 24-hr. curing cycle yielded excellent results from the standpoint of quality, but costs ran quite high. Aware that a considerable amount of the steam generated was going into the concrete masonry walls and roofs of the kilns, officials first attempted to reduce this loss by insulating the rooms. The cells of the blocks in the side walls were filled with vermiculite, and 3 in. of vermiculite, followed by conventional built-up roofing, was placed on the Dox roofs. This step slowed down the rate of heat loss after the kilns were brought up to temperature, but seemed to have no significant effect upon the total steam consumption.

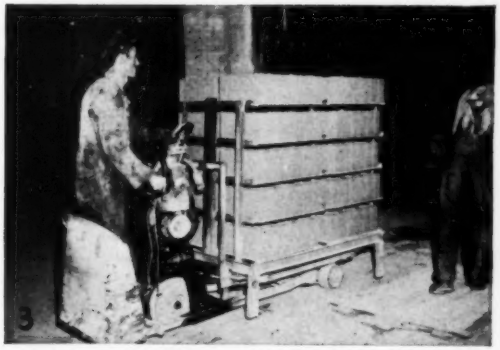
Subsequently ½ in. of vermiculite plaster was applied to the interior surfaces of the walls and roofs, and a brush-on coat of high-heat asphaltic paint was applied over the plaster. At the same time Universal

One of the company's tractor-trailer units with a load of cubed block.

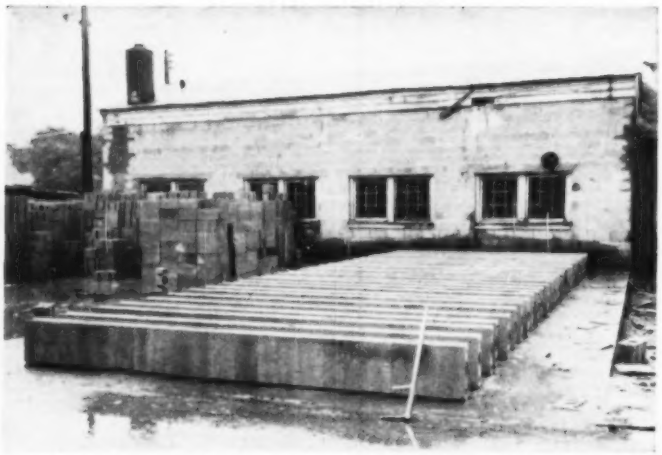
Door Carrier Uni-Temp aluminum doors were installed on all of the kilns to control heat loss at these critical points.

These tightening-up measures (*i.e.* the insulated kiln doors and the vapor seal on the interior wall surfaces) effected an immediate 50-percent reduction in steam consumption. This would probably have brought the matter to a close, except that some thought had already been given to the economy which might result from the installation of automatic steam control valves. The possibility seemed promising enough to justify the additional investment, and accordingly the steam line entering each kiln was equipped with a Fulton Sylphon automatic control valve. These valves, which operate thermostatically, throttle the steam entering the kiln to hold the desired 170-deg. temperature until such





1. View of the kiln doors from inside the plant. Arrow points to one of the steam control valves.
2. This high-production automatic block machine is operated two shifts per day.
3. One of the lift trucks removing a loaded rack of green blocks from the block machine.
4. Concrete for various special precast products is mixed in a portable mixer and hauled by means of a gasoline-powered wheelbarrow to the several points of use throughout the plant yard.
5. Here one of the power-driven wheelbarrows is discharging concrete into a septic tank mold.
6. Cubed units are handled in the yard with fork lift trucks.



A day's output of Dox plank lined up on a concrete slab outside the building. A separate plant will be built in the near future to house this activity.

time as the steam is cut off altogether. The difference between the precise control thus obtained, and the far-from-precise control which had resulted from operating valves by hand, amounted to *another* 50 percent reduction in steam consumption. Actual steam consumption in the company's kilns is now less than one-fourth of what it was before these conservation measures were begun. Steam for curing and space heating is supplied by a 100-hp. Cleaver-Brooks automatic oil-fired steam generator. There are two 10,000-gal. storage tanks for oil.

The Knox plant was originally designed to operate on prepared aggregates, and this practice has worked out so well that it has remained essentially unchanged. Materials used include sand and gravel, Superock, cinders, and a lightweight burned shale product known as Red Dog. In block the latter material produces an 8- by 8- by 16-in. unit weighing about 34 lbs., compared with approximately 30 lb. for Superock.

A dual aggregate handling system is used, so that two types of material can be fed to the plant bins simultaneously. This arrangement has the additional advantage of making it possible to carry on normal operations with either circuit in the event of a breakdown in the other. Each circuit consists of an undertrack hopper, a 65-ft. belt conveyor, a bucket elevator, and an overhead steel bin which can accommodate a carload of material.

Additional quantities of the materials in greatest demand are stored in open stockpiles adjacent to the rail siding. Thus the plant can continue to operate for a limited time in the event that shipments are interrupted. Stockpiling, and reclaiming from stockpiles, is done with a stiff-leg derrick and a clamshell. In the reclaiming operation the same hoppers, conveyors, and elevators are used as in handling regular incoming shipments.

About a year ago the company designed and built its own bulk cement plant. It is a recirculating type plant, with a live storage capacity of 200 bbl. in an upper cone, supplemented by about 800 bbl. which can be recovered from the lower portion of the same circular silo. For this project the company designed its own silo block unit, and had a special mold box made so that the blocks could be produced on the Besser Super Vibrapac. These units worked so successfully that they were immediately incorporated into the firm's varied line of concrete masonry products.

In 1945 Knox Concrete Products became the first plant in the country to be licensed to manufacture Dox plank. This phase of the business, helped by some sound promotional effort, has increased steadily, and the available facilities for manufacturing the product have been outgrown. Present plans calls for the construction of a separate plant for this activity, incorporating more efficient production methods recently perfected by the patent holders.

Dox plank and a number of other precast concrete specials are now produced on concrete slabs adjoining the block plant building. This method has lent itself to a considerable degree to departmentalization of the various operations, with every outward evidence of considerable efficiency and economy. Concrete for these secondary activities is mixed with a Jaeger portable mixer, and is hauled to the several points of use with Bell Aircraft prime movers. The latter units are gasoline powered, and have a capacity of about 1,000 lb.

The company cubes all masonry units that can be handled by means of forks. Sizes or types of units which can not be cubed and picked up directly by fork trucks are stacked in the storage yard by hand, in preference to cubing on skids or pallets. Green blocks are handled with a Truck-Man platform lift truck, but after curing Clark and Hyster fork lift trucks are used. The company also operates three large flat-bed trailer delivery units — two WA14 Whites and a Reo 20, in addition to a WA14 White which is specially equipped for handling and placing septic tanks.

W. F. Moehlman is president of Knox, K. C. Hardcastle Jr., is vice-president, and Ernest M. Barnes is general manager and secretary-treasurer. Due to the great variety of products manufactured, direct supervisory responsibilities are shared by two men. Amos Brown, who has the title of plant superintendent, is responsible for block production, truck operations, and general maintenance. The production of Dox plank, septic tanks, lintels and other special items is under the supervision of W. F. Pellaux.

Great Lakes Carbon Corp. Issues Permalite Brochure

A new illustrated eight-page brochue describes the use of Permalite aggregates in concrete, as a lightweight insulating roof fill. Various features of Permalite concrete are described—its insulating properties, fire-resisting and lightweight qualities, strength, and economical final cost-in-place. Also included are various mix designs and other technical data. For the convenience of architects in specifying a lightweight Permalite concrete roof fill, a typical specification is included.

The brochure is available on request from Great Lakes Carbon Corporation, Building Product Sales, 18 E. 48th Street, New York 17, N. Y.

According to a recent bulletin on perlite received from Perlite S. R. L., Milan, Italy, the exportation of the material from Sardinia, the site of several deposits, to the United States would be economical and entirely practicable. Perlite is found in several areas of the Italian mainland, as well as on numerous islands.

Dallas Firm's Central Mix Plant Rates Among Finest in Southwest

another ON THE SPOT report

HARD work on fundamentals, good timing, and a sustained building boom have combined to make Wamix, Inc., of Dallas, Texas, one of the most rapidly growing organizations in the ready-mixed-concrete industry. From a very modest beginning with second-hand equipment set up on leased property, in three years Wamix has become a thriving enterprise, operating a high-capacity plant which is equipped with the most modern controls available.

Wamix was formed in April, 1948, by Thomas L. Amis and O. B. English. The original plant was set up for central mixing, with a capacity of about 250 cu. yd. per day.

By WILLIAM M. AVERY

Frequent breakdowns, recurring shortages of cement, and a rather poor strategic location presented serious obstacles almost from the start, and within two years of its formation the company began preparations for building a new and much larger plant. An excellent 4-acre site was obtained in the Trinity Industrial District to gain ready access to the parts of Dallas where building activity was greatest.

Fortunately a modern 1,000-cu.-yd.-per-day Butler central mixing plant, designed and set up to Corps of Engineers specifications, was available at Denison, Texas, where it had been used in the construction of Denison Dam. It met in every way the requirements of Wamix, and in respect to capacity probably exceeded them. At any rate, the plant was purchased, dismantled, transported to Dallas, and reassembled there near the banks of the Trinity River. The first batch

• Left: A general view of the new 1,000-cu.-yd.-per-day central mixing plant of Wamix, Inc., Dallas, Texas.

• Left, below: One of the six 6-cu. yd. agitators which operate from the new plant.

• Below: When necessary, bagged cement can be fed into the cement screw through the hinged steel hopper at the right. Most of the bagged material stored under the silo in this photograph was shipped from Japan.

was loaded at the new location on August 8, 1950.

Aggregates are brought to the plant by trucks which discharge at grade into a 15-cu. yd. underground hopper. The materials flow from the hopper, which has a vibrator on the side to prevent bridging, onto a 36-in. wide by 302-ft. centers Link Belt inclined belt conveyor, which is equipped with a Reliance rubber belt. The conveyor is driven at 200 ft. per minute by a 40-hp. motor and a Link Belt gear reducer. At the top of the plant, approximately 85 ft. above grade, material is discharged into a turnhead which directs the flow into the three compartments of the bin. The turnhead is positioned electrically by means of pushbuttons located at the ground-level receiving hopper, so that the operator stationed at this point has complete control over the entire aggregate-handling circuit.

This system, which provides storage capacity in the overhead bins sufficient to produce about 300 cu. yd. of concrete, is so utilized as to dispense entirely with open stockpiles. Aggregates are brought in regularly throughout the day, and the practice is to keep the bins as nearly full as possible at all times. The company feels that the elimination of rehandling material from stockpiles has been an important factor in holding down costs. A helpful factor, of course, is the ready accessibility of sand and gravel.

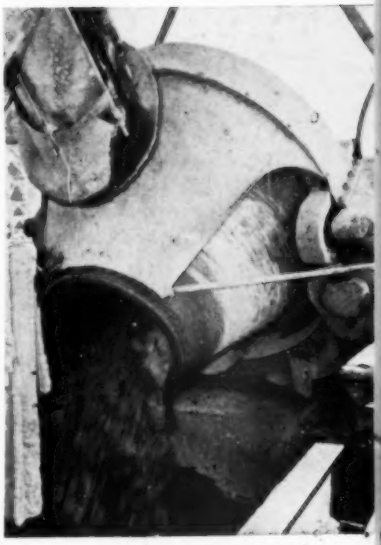
The storage and handling system for bulk cement provides capacity for one 400-bbl. car in the fourth compartment of the overhead bin, and a little over 1,200 bbl. (or three cars) in a steel silo located between the plant proper and the rail siding.

• One of the two 2-cu. yd. tilting mixers discharging into the receiving hopper.

The handling circuit consists of an enclosed undertrack screw conveyor, a bucket elevator which discharges into the plant bin, and a steel pipe which carries the overflow from the bin into the storage silo. The same 9-in. screw conveyor and bucket elevator are used to reclaim cement from the silo. A carload of cement can be unloaded with this system in 2½ to 3 hours. A noteworthy feature of the installation is the assurance of trouble-free operation gained by locating the screw conveyor about a foot above ground level. Another somewhat unusual feature is the provision of a hinged hopper over the cement screw for feeding bagged cement when necessary.

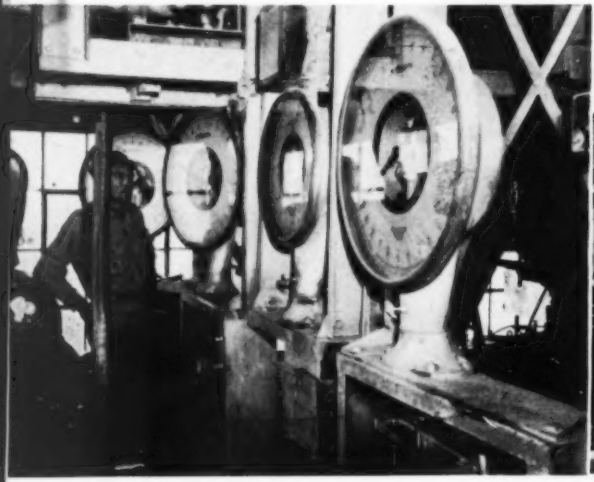
The batching system is as fast and as fully automatic as ingenuity can make it. The materials (cement, sand, and two sizes of gravel) are weighed simultaneously into separate hoppers by Kron Springless dial scales, and are then discharged automatically into a collecting hopper. Depending upon the setting of a manually-operated flop gate, the collecting hopper discharges into either of two 2-cu. yd. Koehring tilting mixers located just below the batching floor, and the mixers in turn discharge into a 6-cu. yd. collecting hopper from which the transit mix trucks are loaded. An air-operated clam shell gate in the lower hopper is controlled by the truck drivers.

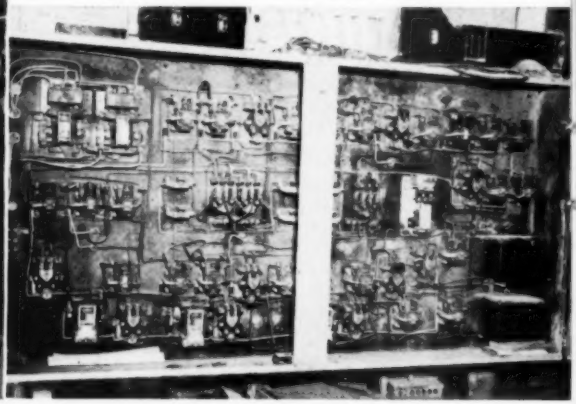
Three pushbuttons control the major steps in the batching cycle. One controls the cement screw conveyor, which operates at high speed



until most of the material is in the weigh hopper, then automatically changes to low speed until the exact amount has been weighed out. The introduction of water and the weighing out of all three sizes of aggregate are controlled by a second pushbutton, while a third button charges either of the two mixers. All bin gates are operated by gear motors equipped with limit switches, while the latches which operate the counterweighted gates under the weigh hoppers are actuated by solenoids. There is also a limit switch on the flop gate over the mixers, so that the upper collecting hopper cannot be discharged unless the gate is in the proper position.

Wamix uses Pozzolith in all mixes





• Left: A view of the four springless dial scales on the batching floor.
• Below: This photograph shows some of the complex wiring and controls required by a modern automatic batching plant.

which are to be used in pouring beams and similar structural work. Darex is also used extensively for entraining air. Dispensers controlled by automatic timing devices are used for both of these admixtures, and the amount of air entrainment is additionally controlled by the daily use of an air meter at the plant and on the job.

As stated earlier, the plant has a capacity of 1,000 cu. yd. per day, but up until the present time the almost chronic shortage of cement in the Dallas area, and the limitations of the truck fleet, have made it impossible to operate at full capacity. Additional trucks are being added as rapidly as possible, and it seems likely that by the end of the year it will be possible to operate fairly close to capacity.

The fleet of trucks which at present normally operates from the new plant consist of six 6-cu. yd. Challenge units mounted on G.M.C. chassis, a 4-cu. yd. Jaeger machine, a 4-cu. yd. Hercules, and a 3-cu. yd. Dumpcrete. At need, however, this fleet can be supplemented by any or all of seven trucks which operate from a separate dry-batch plant which Wamix purchased early this year. The latter plant, located in northeast Dallas, was formerly operated by the North Texas Building Materials Co. It is a two-stop plant equipped with a 105-ton 3-compartment Blaw Knox bin which is fed with a clamshell. Capacity runs about 350 cu. yd. per day. Operations at this location are conducted under a different company name (the Red-D-Mix Corp.), and the plant is served by a separate fleet of transit mix trucks which includes five 3-cu. yd. Smiths, a 4-cu. yd. Rex, and a 4-cu. yd. Jaeger. Whenever the needs of a particular job can be served to better advantage, haulage units assigned to one plant are operated temporarily from the other.

At the Red-D-Mix plant, where aggregates are stored in open stockpiles, facilities are already available for dry batching lightweight concrete, and work is now in progress to incorporate this feature in the Wamix setup. There a fourth bin compartment, and batching scale are being installed so that lightweight materials can be handled without stockpiling and reclaiming. These facilities will be utilized in supplying some 20,000 cu. yd. of central-mixed expanded shale concrete for a new bank building in Dallas.

In building markets for its product, Wamix has made extensive and

Heltzel
BUILDS IT BETTER

GEARED TO YOUR PRODUCTION NEEDS

Engineered FOR THE JOB

STATIONARY BATCHING PLANTS

PORTABLE BULK CEMENT PLANTS

PORTABLE AGGREGATE PLANTS

STORAGE BINS

BELT CONVEYORS

STEEL FORMS

CURB & GUTTER AIRPORT-HIGHWAY SPECIAL FORMS

BUCKET ELEVATORS

CONCRETE BUCKETS

● Heltzel-engineered equipment provides that element of efficiency so important when man hours count highly. Each product in the Heltzel line is backed by 40 years experience in the concrete industry. Contractors and concrete producers know that Heltzel builds quality, high performance equipment. It stands the test of time and rugged operating conditions. Some of the Heltzel line of products are pictured here.

Specific information on any Heltzel equipment may be had by writing to our Warren office or contacting your nearest Heltzel distributor.

HELTZEL

STEEL FORM & IRON CO.

WARREN, OHIO

intelligent use of advertising. The widest possible use has been made of direct mail, and considerable success has been achieved through this and other media in persuading users of concrete to ask for Wamix rather than for concrete. Both companies are represented by two-column color ads in the current edition of the classified telephone directory for Dallas. Future plans call for a series of institutional ads which will appear in local newspapers and in such periodicals as the *Texas Contractor*, the *Dallas Home Builder*, and the Chamber of Commerce magazine. The series, which will run for six months or longer, will be concerned primarily with job histories.

The two companies at present employ about 30 men. Tom Amis, president of Wamix, has had wide experience in the construction field, including a tour of duty with the Army Engineer Corps during World War II. His brother, Joseph S. Amis, vice-president and general manager of the company, also has a background in the construction industry.

Richard S. Yant, president of the Omaha Concrete Products Company, Omaha, Neb., died unexpectedly at his home on April 27. He was 38 years of age.

Pumice from Volcanic Bed Supplies Washington Plants

Seven firms are turning out pumice building units in the north-central portion of Washington, using raw material of a volcanic origin for which the 10,000-ft. Glacier Peak of the Cascades was responsible. In an eruption of the former volcano thousands of years ago Glacier sent molten rock flowing down its sides and over the surrounding area to a depth of 50 to 100 ft. Today these deposits furnish pumice for the growing pumice block industry.

The concerns utilizing the native pumice are the plants of H. Lundquist at Brewster, Bill Asher at Entiat, J and J at Tonasket, Bild-Well and Batterman's Concrete Products at Wenatchee, Pyramid Products at Ephrata, and Joe Schultz at Leavenworth.

Twenty-Two Trucks Saved As Fire Destroys Block Plant

A fire thought to have been started by an overheated furnace roared through the block-long plant of the Standard Building Materials Company in St. Paul, Minn., on June 7, damaging the facilities to the extent of $75,000.

In addition to the interior of the building, two block machines and five trucks were destroyed. Passersby aided in saving 22 other trucks before the fire reached the garage at the south end of the plant.

James Wagner, a mechanic, discovered the fire, which had started around the stoker furnace used in curing concrete block. Before the fire department could respond to a call, however, the flames, fed by exploding gasoline and oil drums, had swept up to the 65-ft. superstructure.

Edward J. Reaume was recently appointed sales manager for the ready-mixed concrete and building supplies, according to an announcement released by Koenig Coal & Supply Company officials at Detroit, Mich. Mr. Reaume has been associated with Koenig for 17 years and had served as assistant sales manager.

The Lafayette Concrete Pipe Company, Inc., has moved to its new location east of the Lafayette, La., city limits, where they are building a concrete pipe plant. Tom Bostic is manager.

The plant of the Batesville (Ark.) Block and Material Company, equipped with new vibrator-type machinery, has been placed in operation and is now turning out 500 concrete blocks daily. F. L. Galloway is owner and manager.

Operation of the Marion Block Company was begun recently by R. Gordon Levi and his son, George N. Levi, at Belmont, Ky. G. N. Levi is manager and Charles Hill is foreman.

Baughman

BULK CEMENT TRANSPORT

Designed and engineered specifically for high speed, efficient handling of cement in bulk at low cost. Eliminates the expense of special built-to-order equipment because it's produced by Baughman's modern assembly line methods—all standard sizes in lengths from 15 to 33 ft.

MORE PAYLOAD! Built of high tensile alloy steel for more strength with less weight . . . more resistance to rust and abrasion. Waterproof loading ports spaced for capacity loading . . . catwalk top . . . climbing ladder. Self-supporting roof. Electro-welded throughout.

Self-Unloading Twin screws give fast action. Special air cells assure quick starting and positive discharge. Powerful motor. All controls conveniently located on outside of body. Simple, positive and immediate. *USUALLY DELIVERED FROM STOCK — WRITE FOR DETAILS.*

BAUGHMAN

BAUGHMAN MANUFACTURING CO., Inc.

107 Shipman Road, Jerseyville, Illinois

"There is a Baughman Distributor Near You"

NEW MACHINERY and SUPPLIES

● Brick Palletizing

A method of palletizing brick has been developed by the Gerrard Steel Strapping Company, 2915 W. 47th Street, Chicago 32, Ill. While the method was developed for clay brick shipments, similar methods could be used for special surfaces and shapes of concrete products. The main feature of the method is the use of round steel strapping to bind the load in two directions, coupled with the use of corrugated board to give stiffness where needed.

● High Speed Vibrator

Uni-directional vibration at high speed is featured in the "Vibrolator," a device using compressed air at 50 to 150 p.s.i. to drive a hardened steel ball around a race, creating a powerful vibration. Air consumption ranges from 1 cu. ft. a minute to 2.20 cu. ft. in the largest model.

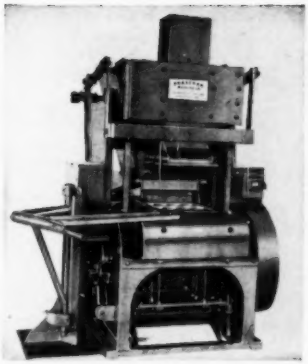
The vibrator is said to be noiseless in operation and is self-lubricating. No maintenance is required. The Vibrolator

serves cement and aggregate bins, as well as concrete molds and forms. Vibration ranges from 22,000 vibration per minute in the smallest size to 7,000 per minute in the largest. The Vibrolator is a product of the Martin Engineering Company, Kewanee, Ill.

● Automatic Block Machine

Featuring a combination of vibration, tamping, and packing, the 1951 Model of the Praschak automatic "400" block machine is said to give excellent results in automatic concrete block production. It is produced by the Praschak Machine Company, Marshfield, Wis.

The new model has power-driven tampers in the material supply box which operate at a speed of 200 blows per minute during the vibrating period to compress the block material. Dual-centered vibration adds to the formation of a well-packed texture through the entire block. A heavy press top packer-head completes the compaction and produces a smooth-topped block.



Four hundred blocks are produced per hour by the machine, which uses cored pallets in automatic operation.

Asbestos-Cement Products Association, 509 Madison Avenue, New York, N. Y., offers a free booklet describing the uses of asbestos-cement building materials in homes, on farms, and in commercial and industrial buildings.

Elmira Transit Mix, Inc., Elmira, N. Y., combined a safety meeting with a breakfast for 25 employees. O. J. Gould of Syracuse, safety engineer of the Utica Mutual Life Insurance Co., addressed the group and showed a film on safety.

ARMOR COAT Keeps Homes and Basements DRY

● Designed particularly for masonry surfaces, ARMOR COAT keeps water out . . . *keeps builders happy!*

● Equally effective on both exterior surfaces and interior walls of basements, ARMOR COAT seals . . . completely.

● In worldwide use for over 20 years. Easily applied, just like paint. *Widely used and acclaimed by the concrete-products industry.*

**A few dealerships still open to wide-awake concrete-block manufacturers.*

Armor Coat
ARMOR LABORATORIES, INC. • GLENDALE, CALIFORNIA

Looking for Used Equipment?

Refer to the listings in this issue for a wide variety of used and surplus machinery and supplies.

MEETING LOAD LIMITATIONS WITH HIGH CAPACITY

5 OUT OF 6

Large Producers of Ready Mixed Concrete in the Miami, Florida area Now use...

HI-LO TRUCK MIXERS

There Must be a Reason!

CONCRETE TRANSPORT MIXER CO.
Phone Flanders 7800
4989 FYLER AVE. • ST. LOUIS 9, MO.
Serving the CONCRETE INDUSTRY 20 YEARS

THE Cleveland Type LSRR air vibrator is equipped with a cast steel male bracket which fits the female bracket that is standard equipment on most covered hopper railroad cars.

The LSRR is air-operated and is easily adapted to bins, hoppers, chutes and mine cars. Female brackets are obtainable from us for any application where only periodic vibration is required.

You can get gentle, easy vibration against the skin of your materials handling container or heavy, hammer-like blows, because, with AIR, the intensity of vibration can be varied at will.

BIN STUCK LATELY? No need to be. The LSRR will eliminate your troubles in a matter of seconds. Catalog No. 106 will give you further details.

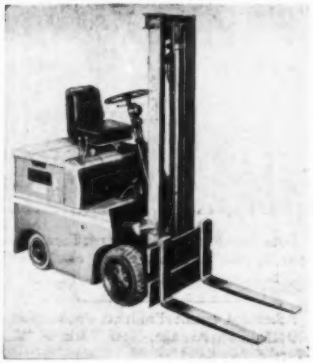
THE CLEVELAND VIBRATOR COMPANY

2711 Clinton Ave. • Cleveland 13, Ohio

● Electric Lift Truck

An electric battery-powered lift truck, called the "Clipper" is announced by the Clark Equipment Company, Battle Creek, Mich.

Features of the new truck are its 2,000-lb. capacity at 24-in. load center,



fingertip directional lever, automatic acceleration, deadman safety control, and cushion style tires.

The directional control lever selects the direction of travel and engages the first motor speed, and automatic acceleration eliminates jerks and errors. The deadman control locks the control lever in neutral and sets a parking brake when the driver's seat is unoccupied. The approximate dimensions are length, 64 in.; width, 35 in.; wheelbase, 37 in.; height, 83 in.; and lift, 124 in.

● Break Resistant Blade

The new Clipper "B-R" abrasive blade, a product of the Clipper Manufacturing Company, 2800 Warwick, Kansas City 8, Mo., is said to be an outstanding development in masonry cutting. The blade can be dropped, twisted in the cut, or bent without damage.

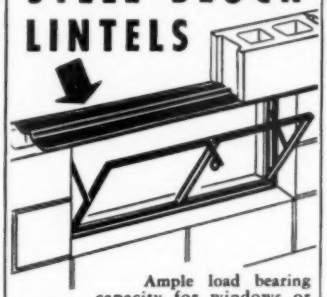
It is made of layers of glass fiber cloth impregnated with resins and silicon carbide. Hydraulic pressure and scientific kiln heat processing produces a tough

and resilient blade. It is used most effectively on limestone, concrete products, etc. The blade also gives good performance when mounted on hand-held power tools where it is impossible to maintain a true cutting level.

For better, stronger window installations

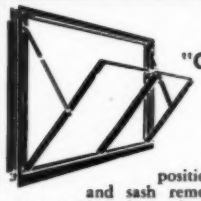
VENTO

STEEL BLOCK LINTELS



Ample load bearing capacity for windows or doors. Available from 2-ft. 6-in. to 5-ft. Formed from 10 gauge hot rolled steel with stiffening crimp in center. Beveled edge provides masonry bond and seat for mortar. Saves costs through use with standard 8-inch blocks. Vento pressed steel angle lintels for brick construction also available.

VENTO STEEL BASEMENT WINDOWS



VENTO "CHAMPION"

Three sizes. Effortless operation gives three position ventilation and sash removal. Double contact with leak-proof water-shed sill stops wind and rain. 14 gauge electric welded frame. Fins welded to jambs for easy installation in block or poured walls.

VENTO "THRIFTY"

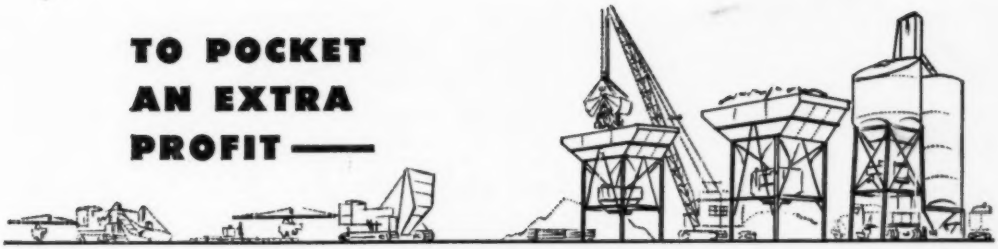
A real economy window for lower cost housing. Three sizes, sturdy construction, smooth operation, two position ventilation and easy sash removal. Fin flanges at jambs for quick installations.

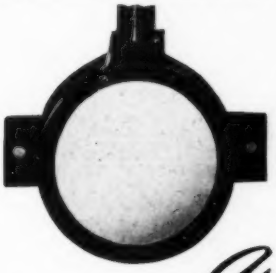
Also *casement, utility and barn windows. Write for full information.*

VENTO STEEL PRODUCTS CO., INC.

254 COLORADO AVE. BUFFALO 15, N.Y.

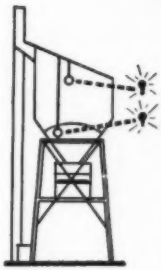
TO POCKET AN EXTRA PROFIT ——





EQUIP YOUR PLANT FOR TOP PRODUCTION!

LITTLE THINGS can count up big in the profit column. Little things that keep your batchers running smoothly hour after hour — day after day; little things that save in costly, critical manpower.



As examples:

BUTLER Positive BIN LEVEL INDICATORS. They'll fit any make of plant; work with virtually any material. Sealed against moisture or dust. Practically indestructible yet sensitive as a violin. And absolutely POSITIVE in action.

BUTLER AIR JETS

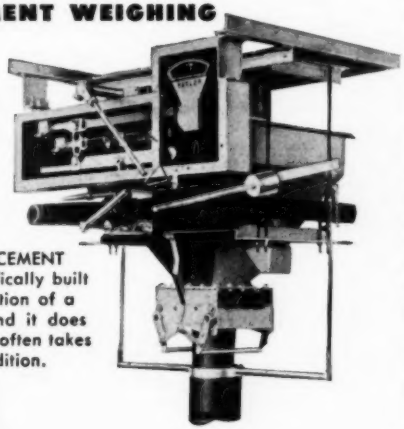
Instant-acting, trouble-free, positive and durable. Worth their weight in diamonds when cement gets obstinate. Install them and activate them with the —

BUTLER CEMENT AERATOR

Nothing else like it. So compact it takes only the space of a standing man. Yet, everything's there — compressor, tank, motor and all controls — all in one neat package. There's a dual pressure take-off so you can use air for other applications. Flat tires, for instance.

BUTLER CEMENT WEIGHING BATCHERS

We hope you haven't—but if you have a bulk cement bin made by someone other than BUTLER you can still get the advantage of quick accurate batching by installing a BUTLER CEMENT BATCHER. It's specifically built to match the production of a dual drum paver and it does it so superbly that it often takes care of a 27E in addition.



BUTLER ELECTRIC VIBRATOR

A highly practical traffic-cop to keep cement from loafing in the batcher. And as a signal to your truck driver that the batch is complete it sends him off to a quick start, too.

Want to look over the best in Bulk Cement Plants? Ask for Bulletin 210. It's FREE!

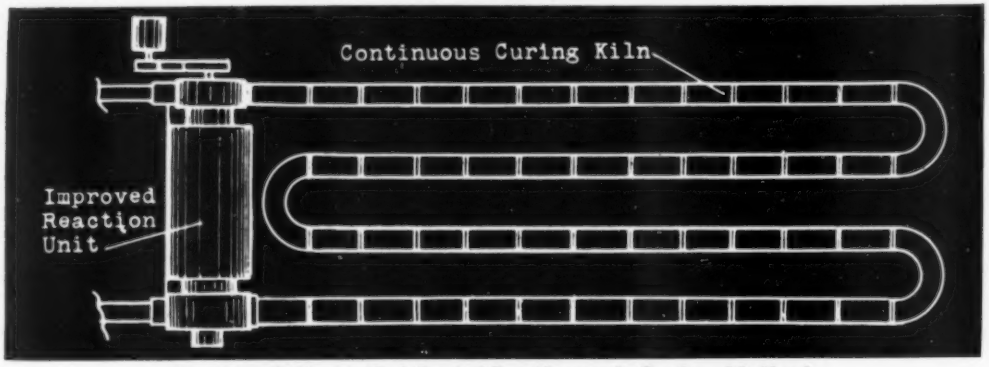
Any of these you want more information on? Just a postcard will get our prompt attention.

BUTLER BIN CO.

987 BLACKSTONE AVE. WAUKESHA, WIS.

MODERN DRI-FAST CURING TAKES OBSOLESCENCE OUT OF YOUR PLANT

The Greatest Advance in Curing Precast Masonry Units, Cement and Cinder Blocks—Offers Outstanding Advantages



Improved Nugey-Dri-Fast (Continuous) Curing Method

(For full description see P & Q June 1951 issue—pages 132 to 137)

Basic Factors	Steam Cured	Dri-Fast Cured
Press cap'y/hour	600	600
4-kilns cap'y/24 hrs.	3,800	
1-kiln cap'y/10 hrs.		6,000
Total cap'y/week	19,000	30,000
Cement used, sacks	1,011	240
Cinders used, cu. yds.	264	90

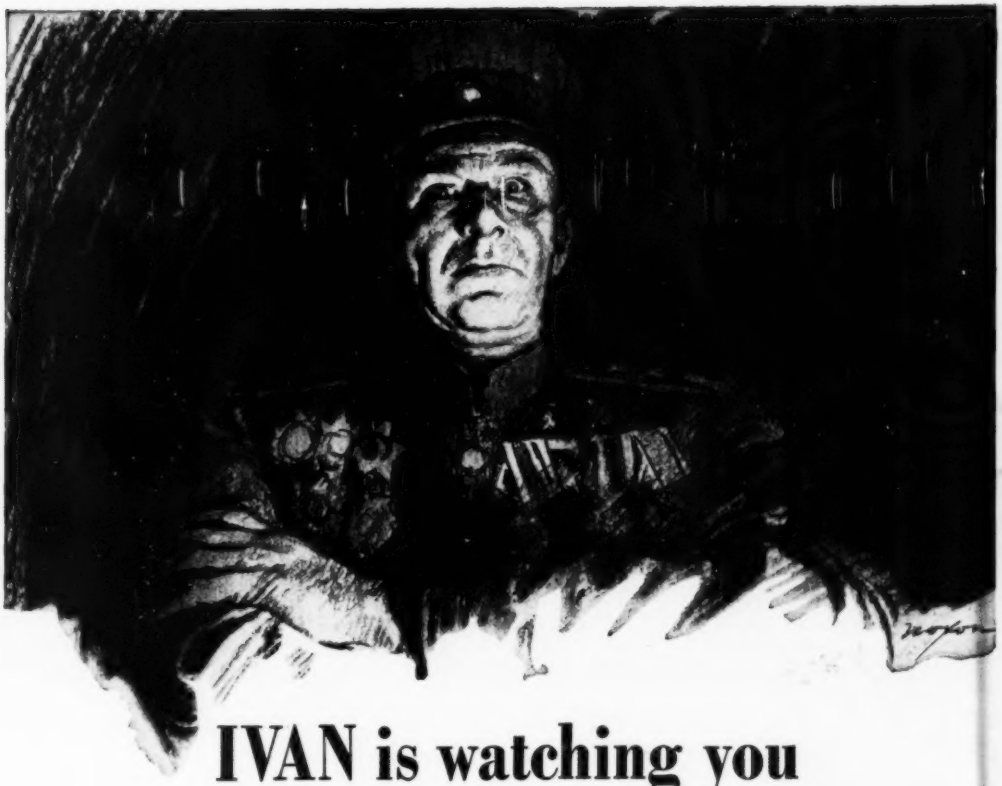
1—SIMPLE . . . COMPACT . . . POSITIVE
2—SAVES CEMENT . . . REDUCES LABOR
3—LOWERS MAINTENANCE COST
4—MAINTAINS SCHEDULES EXACTLY
5—NO WEATHER WORRIES
6—ELIMINATES UNNECESSARY BREAKAGE
7—DISCARDS AIR-HOISTS & RACKS
8—WIDENS PROFIT MARGINS
9—DISCARDS COSTLY STEAM BOILERS

DRI-FAST CURING (Non-Steam) WIDENS PROFIT MARGINS

Cost Of Production (see Basic Factors)	Steam Cured	Nugey Dri-Fast Cured
Cement—1011 sacks @ 80c	$ 808.00	
Cement— 240 sacks @ 80c		$192.00
Cinders—264 c. yds. @ $1.50	396.00	
Cinders— 90 c. yds. @ $1.50		135.00
Labor	343.75	50.00
Steam cost	125.00	
Reaction unit operation		13.00
Electric power	150.00	20.00
Fixed charges	240.00	25.00
Breakage	165.00	10.00
Water	2.50	.50
Miscell. Expenses	125.00	32.00
	$2,355.25	$477.50
Total blocks cured, per week	19,000-units	
Total blocks cured, per day		6,000-units
Unit Cost Per 1-Block (8" x 8" x 16")	12.4c	8.0c

WARNING—All persons, partnerships and corporations are advised to check above patents and patents pending, as all infringers will be prosecuted to full extent of the law.

DRI-FAST PROCESS CORPORATION
P. O. BOX 13
RAHWAY, N. J., U. S. A.
Phone Rahway 7-2598



IVAN is watching you

IVAN is a dyed-in-the-wool Communist. There are only 6 million party members like him in all Russia, yet these Communist brass-hats enforce the iron dictatorship of the Kremlin over *200 million* Russians.

He's sold to the hilt on Red ideas. Which means he's out to get *you*. He believes it's either you or him . . . that the world is too small for both.

Ivan is working hard to beat you down. He has a big head start.

Right now he's got you in a bad spot.

Ivan is afraid of only one thing.

He fears your ability to out-produce him in guns, tanks, planes.

Frankly, he doesn't think you value your free system enough to do it . . . to make willingly the sacrifices he has squeezed out of the Russians.

But he's wrong!

Because you and all of us have set out to build more and better weapons—to do it faster all the time.

We must use every bit of know-how and inventive skill we have to improve our machines and methods—to turn out more and more for every hour we work. Only in this way can we become militarily strong.

But we've got to supply essential civilian needs as well. We can't allow needless shortages to take prices skyrocketing and lower the value of our dollar.

Sure, that means sacrifices for everybody. But doing this double job well is the only sure way to stop Ivan in his tracks—and to save the freedoms which are ours and which he has never known.

FREE *. . . this important booklet tells you how our American System Grew Great*

How Americans developed better machines, power and skills to build a great nation . . . Why we have been able to produce constantly more per hour . . . How this has given us the world's highest living standard.

How we can meet today's challenge—Why we must expand our productive capacity . . . supply arms and essential civilian needs, too. Read how this dynamic process works in free booklet, "The Miracle of America," endorsed by representatives of management and labor. Send for your free copy today!

MAIL THE COUPON—
The Advertising Council, Inc., 25 West 45th St., Dept. B. P. New York 19, N. Y.

Name_____

Address_____

Occupation_____

This advertisement, approved by representatives of management, labor and the public, is published in the national interest

THE BETTER WE PRODUCE
THE STRONGER WE GROW

Stabilized drainage ditch of concrete block construction parallels West Cary Street in expanding suburban area of Richmond, Va.

Built by: **VIRGINIA HIGHWAY DEPARTMENT.** Block Manufacturer: **CONCRETE PIPE & PRODUCTS CO., INC.,** Richmond, Va.

NEW USES open up NEW MARKETS

for sale of concrete masonry units

In run-of-mill business, competition is always keen. For easier sales and extra profits, look for the *unusual uses* of concrete masonry units. They're all around you, awaiting discovery, ready to pay you the finder's award. An example of an unusual use is the drainage ditch shown here . . . constructed of concrete units made with Lehigh Air-Entraining Cement.

The use of Lehigh Air-Entraining Cement for concrete masonry products is increasing rapidly. Manufacturers say it produces stronger, better-looking units . . . that its use results in smoother plant operations, fewer culls and throwbacks, greater all-round economy.

Whether you make special or standard units, try Lehigh Air-Entraining Cement with your own aggregate. Our Service Department will be glad to assist you with your specific problems.

LEHIGH PORTLAND CEMENT COMPANY
ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

LEHIGH CEMENTS

LEHIGH PORTLAND CEMENT • LEHIGH EARLY STRENGTH CEMENT • LEHIGH AIR-ENTRAINING CEMENT • LEHIGH MORTAR CEMENT

Concrete Manufacturer Classified Section

Advertising Rate Per Issue: $10.00 a Column Inch. Lower Rates on a Contract Basis — Write for Rate Card.

WANTED

12" and 4" Mold box for # 7 Joltcrete

J. D. Clark Block & Supply Co.
4930 Belleville Rd.
Belleville, Mich.

CEMENT COLORS

Write for free samples and prices of "LANSCO" CEMENT COLORS produced in 24 attractive shades. Packed in bulk and in 1 lb. and 5 lb. packages.

manufactured by
LANDERS-SEGAL COLOR CO.
71 Delevan St. Brooklyn 31, N. Y.

CONCRETE PLANT FOR SALE

Complete Ready Mix Concrete Plant, bulk cement, five high discharge truck mixers. Good prospective business in a fast growing community. 50% will handle.

Write Box 1007, Sweetwater, Texas

FOR SALE

1 Stearns Model A Power Clipper in good condition with 4", 8", and 12" molds. Price: $1400.00 f.o.b. our plant.

Watkins Concrete Blocks Company, Inc.
4215 R Street Omaha, Nebraska

FOR SALE

Stearns No. 9 Joltcrete, complete with power carriage & offbearer 8" attachment with 5,000 P. S. pallets. Replacing with Model "15".

STANDARD CINDER BLOCK COMPANY
P. O. Box 2016 Raleigh, N. C.

FOR SALE

COMPLETE BRIKCRETE EQUIPMENT FOR $1,500

1 Densifying Machine with motor & transmission.
1—8"x12" Mold Assembly.
1—8 x12" Mold Assembly. Halves & corners.
1—4"x12" Mold Assembly.
1—4"x12" Mold Assembly. Halves & corners.
1 Automatic Power Feeder, complete with Motor Transmission.
1—No. 10 Cu. Ft. Mixer with conveyor or hoist motor & trans.

WRITE: FRED R. MARTIN
R. R. NO. 1 BOURBONNAIS, ILLINOIS

STEARNS "A" CLIPPER

Good condition, complete with motor, 8" mould, 1400 steel pallets, sash and corners. Ready to make block — $1000.00.

VIBRATED CONCRETE COMPANY
35th & Wynkoop Sts., Denver 5, Colorado

HELP WANTED

New concrete products plant to be erected near New York City wants overall superintendent experienced in McCracken and Quinn pipe, cast pipe, and concrete planks, etc.

Replies held in strictest confidence. Please state experience, education, age and salary desired. Position available immediately in connection with construction of plant.

Address Box No. 805
c/o Concrete Manufacturer
538 S. Clark St., Chicago 5, Illinois

FOR SALE

(F.O.B. Our Plant) (2) F. M. C. 180 Fully Automatic Complete with Motor, 1½ Year Old. Price Each $1,483.00
(1) 4" Mold Box. Price $168.00
(1) 6" Mold Box. Price 167.00
(2) 8" Mold Box. Price Each 166.00
(1) 12" Mold Box. Price 326.00
(includes feeder hopper)

STEEL RACKS

(40) Racks—Capacity 48 Blocks per rack. Price each $23.00
(Dismantable)
(1) Bonded Scale Crusher, Capacity 25 yds. per Hour Without motor. Price $280.00

COLONIAL BLOCK CORPORATION
Fairview Blvd. & Virginian R. R.
Norfolk 9, Virginia

FRANTZ PALLET-PATTERN SERVICE NOW AVAILABLE

- Aluminum shortages make it quite impossible to supply all our customers with famous Frantz aluminum-alloy block and pipe pallets.
- However, our skilled pallet-pattern service enables you to save freight charges by having your pallets cast locally, using Frantz precision-made patterns.
- Any size or shape, for any machine on the market — plain, interlocking or reversible.

FRANTZ PATTERN & FOUNDRY CO.
2201 E. Artesia St., Long Beach, Calif.

FOR SALE

1—42 Cu. Ft. GOCORP Mixer, complete with 30 H.P. motor, 220—3 phase, 60 cycles. Like new.

Box No. 809, c/o Concrete Manufacturer
538 S. Clark Street, Chicago 5, Illinois

ADVERTISE YOUR "WANTS" AND SURPLUS EQUIPMENT

CONCRETE MANUFACTURER
538 S. Clark St., Chicago 5, Ill.

FOR SALE

Joltcrete No. 9 Block Machine

with complete attachments and spare parts . . . good operating condition.

Steel Pallets

for above listed machine

6916—4"———5008— 6"
7089—8"———3764—12"

These are good as new.

Racks

50 racks of 96 block capacity. This equipment may be inspected at our Kansas City plant. Subject to prior sale. . . . All above listed material priced at $14,600. If racks are not wanted deduct $1,000. Will sell Joltcrete machine and attachments only at a price of $4,500 without pallets, but will not sell pallets until machine is sold . . . write, wire or phone A. R. Waters at

THE CARTER-WATERS CORP.
2440 Pennway, K. C., Mo.
Phone Grand 2570

GRANULITE*

Can be the answer to your light weight aggregate problem if you operate vibrating equipment.

Phone
ANdover 3-2664
For Information
or write

THE GRANULITE COMPANY
605 W. Washington Street
CHICAGO 6, ILLINOIS

*T. M. REG. U. S. PAT. OFF.

RACKS AND PALLETS

For Besser and other machines.

Imported — Good delivery.
Inquiries Invited

Ferro, Ltd. 1741 K St., N. W.
Washington 6, D. C.
REpublic 6335

FOR SALE

3—1940—2 cubic yard Jaeger concrete truck mixers — mounted on G.M.C. trucks. Good operating condition — Reasonably priced.

READY MIXED CONCRETE COMPANY
37 20th Ave. S. Minneapolis, Minnesota
Phone: Atlantic 6547

CONCRETE MANUFACTURER CLASSIFIED SECTION

FOR SALE

1—Stearns No. 7 Jolterete.
2400— 4" Pallets & Mold box.
3000— 8" Pallets & Mold box.
1650—12" Pallets & Mold box.
1—Pallet Dipper.
1—Multiplex Flue Block Machine & 30 pallets. 50—Wooden 48 block racks. This machine was in operation every day up to the time it was taken out.

Reason for selling—Higher production machine was installed.

CONCRETE PRODUCTS CO.
24 West Garfield Street, Shippensburg, Pa.
Phone: 357

"SHALITE"

An expanded shale aggregate for lightweight block and concrete

AVAILABLE NOW

POSTON BRICK & CONCRETE PRODUCTS CO.
SPRINGFIELD, ILLINOIS Phone 83404

FOR SALE

Block Plant and Coal Yard. Located in Anderson, Indiana with a well established business in a rapidly expanding city.

Excellent layout for efficient operation. Three men can produce 2000 8" block in 8 hours.

To include Stripper Clipper Block machine, Steel sand bins, Conveyors, 2 sack mixer, Weighbatcher, 4 curing kilns, 44 steel racks, 2500 4" and 8" pallets, completely automatic oil fired boiler for curing, hand lift truck, 1½ ton International dump truck, 49 Dodge pick up, totalls inclosed plant building, separate office building, 1⅛ acre of ground on car siding, underear unloader, coal conveyor, and scales.

A real year round money maker.

About 11000 to handle.

B & B Block Co., 2230 Hill St., Anderson, Indiana

FOR SALE

1—Stearns Clipper Stripper Block Machine with Gear head motor
1—Mold Box and quick change attachments for making 8" Plain, Cor., Sash, halves
1—Mold Box and quick change attachments for making 12" Plain, Sash Cor., halves and grade
1—Mold Box and attachments for making 4"
1—Extra set of 12" Cores & Tamp feet
May be seen in operation

J. D. Clark Block & Supply Co.
4930 Belleville Rd.
Belleville, Mich.

FOR SALE—USED Pumperete Equipment

1—Rex—Model 190 Single Pumperete Machine 25 cy hr
1—Rex—Model 190 Double Pumperete Machine 35 cy hr with 2000 feet of 7" pipe. Located at Lake Charles, La. In first class condition. Reasonable.

WALTER L. COUSE & CO. VErmont 8-0660
12740 Lyndon Ave., Detroit 27, Michigan

FOR IMMEDIATE SALE

(1) Model A Clipper Stripper Block Machine with 4" — 8" — and 12" mold boxes. Excellent condition. Will sell complete for $995.00.
(1) 18 Cubic foot mixer. Good condition. $195.00.

S & S BUILDING PRODUCTS COMPANY
P. O. Box 7 Hazleton, Penna.

FOR SALE

1 Dunbrik machine, in good condition.
1 16 cu. foot mixer, recently overhauled.
31 racks (each rack holds 720 brick). 20 of these racks are in fair condition. 11 are in poor condition but we have some repair parts to fix them up.
7500 steel pallets in excellent condition.
Approx. $300 worth of repair parts.
Elevator shaft and bucket batcher.
All motors necessary to run this equipment.
We would like to sell the above equipment as a unit. This equipment is now in operation and can be seen in Tifton. Above equipment is 4 years old. Priced for quick sale. $4,995 for all the above equipment F.O.B. Tifton, Georgia.

On this machine you can make the following units:

2¼ x 4 x 8
2¼ x 8 x 8
2¼ x 12 x 8

TIFTON BRICK AND BLOCK COMPANY
Tifton, Georgia

CEMENT BATCHING PLANT

Complete, including aggregate bin, cement bin and batcher and cement elevator.

Write: FRANKLIN LIMESTONE CO.
P. O. Box 910 Nashville, Tennessee

FOR SALE

Van-U-Matic plain pallet block machine, mold box to make (2—8x8x16) (1—16" and 1—6"x16") (1—12" and 1—4" by 16.) Chimney blocks on wood or steel pallets 18x18. A 85 cu. ft. Gardner Denver Compressor with 15 HP motor to operate machine and offbearer hoist. Machine is one year old and in good condition; will sell for less than ⅓ of original cost.

MONTE CEMENT BLOCK COMPANY
MONTEVIDEO, MINNESOTA

MINERAL COLORS for BRICK MORTAR STUCCO-PLASTER-CONCRETE

"Fine Because of Their Fineness"
Ask for samples and recommendations.

BLUE RIDGE TALC CO., INC.
HENRY, VIRGINIA

BESSER VIBRAPAC BLOCK PLANT

WILL SELL ALL—OR PART INTEREST

One of the best plants—located in a busy section of Eastern Pennsylvania. Large, well established. Second machine No. 9 Jolterete with pallets. Fully complete with Blaw-Knox Steel four compartment bins, weighbatcher, bulk cement equipment. Nine Kilns with new boiler & oil burner. Lintelator, crusher, two Towmotors, one Clark lift truck, Scoopmobile. Five motor trucks.

Would cost well over $225,000 to duplicate. Business should be more than $400,000 with excellent profit. Priced to sell — Good reason for selling.

Cash required — about $50,000.

Wire or Write:
Box No. 706, c/o Concrete Manufacturer
538 S. Clark Street Chicago 5, Illinois

CEMENT COLORS

All shades and grades the highest quality.
Write for color cards, prices and samples

RICKETSON MINERAL COLOR WORKS
MILWAUKEE 2, WISCONSIN
Established 1885

FOR SALE

1 Stearns No. 15 Damaged by fire, many salvageable parts.

THE CRUME BRICK CO.
P. O. Box 4 Far Hills Station
Dayton 9, Ohio

USED READY MIX TRUCKS FOR SALE

3-yard T. L. Smith Co. Mixers on Tandem Trucks

CENTRAL CONCRETE CO., INC.
2231 Papin Street St. Louis, Missouri

3-YARD RANSOME

and 2-yard Jaeger transit mixers, each on Mack truck . . . for sale. Good condition; can be seen working. Also, WK Allis Chalmers tractor. Prices are OK.

O. W. HOUTS & SON, Inc.
N. Buckhout Street, State College, Pa.

PRICED TO SELL

Two Blaw Knox Hi-Boy two yard Concrete Mixers mounted on 1948 F6 Ford trucks. Good appearance and in excellent running condition.

GRAYSON LUMBER COMPANY
P. O. Box 1311 Phone 9-1131
Birmingham, Ala.

FOR SALE

Korpac Block Machine with 8 inch line mold, 8 inch bullnose mold, 4 inch bullnose mold, 12 cu. ft. batch mixer, belt conveyor and motors, complete for $1750.00.

Box No. 511, c/o Concrete Manufacturer
538 South Clark Street Chicago 5, Illinois

YOURS TO SERVE

If you have not found the equipment you are looking for, the research dept. of The Concrete Manufacturer can and will gladly assist you. Tell us what it is . . . Write to

Research Dept.
C/O The Concrete Manufacturer
538 S. Clark St. Chicago 5, Illinois

IDLE EQUIPMENT WASTES MONEY

A good way to get back a large part of the money you spent for equipment you're no longer using is to SELL IT.

And, the best way to sell it is through the Concrete Manufacturer, the Market Place for supplies and services.

Let someone else have the benefit of equipment you can't use in exchange for hard cash you can use in other ways.

So important is the Concrete Manufacturer used equipment section that many readers (and there are over 24,000 of them—all potential buyers) turn to it first when C M arrives on their desk.

Tell us what you have to offer for sale or trade, we'll set up the ad for you. Mail today and watch the results.

THE CONCRETE MANUFACTURER
538 South Clark Street, Chicago 5, Ill.

SWAP SELL BUY

100,000 Pressed Steel, Aluminum and Cast Iron Pallets.

IN STOCK

Size	Kind	Code	Price	Quantity	
3"	Steel	Queen	28c ea.	3250	
3"	Steel	Quartz	32c "	3350	
4"	Steel	Zonal	38c "	10000	
4"	Steel	Zorrilla	38c "	9650	
4"	Aluminum		38c "	500	Rectangular Core
4"	FC George Welded		25c "	1000	
6"	Steel	Tory	48c "	4340	
6"	Steel	Totem	49c "	4000	
8"	Steel	Baba	52c "	15325	40% AS Oval Core
8"	Steel	Bobbin	52c "	16450	45% AS Oval Core
8"	Steel	Badger	52c "	18560	40% AS Oval Core
8"	FC George Welded		35c "	600	50% AS Rectangular Core
8"	Aluminum		52c "	1000	45% AS Rectangular Core
8"	Steel	Two Core	35c "	1600	
10"	Steel	Fungas	65c "	1500	45% AS Oval Core
10"	Steel	Emperor	65c "	1500	
12"	Steel	Paddle	85c "	2000	45% AS Oval Core
12"	Steel	Hanson	85c "	2000	
12"	Steel	Pacific	85c "	10000	
12"	Cast Iron		45c "	1200	40% AS Oval Core
12"	Steel	Granite	85c "	10000	

18" x 18" x ¼" Steel Plain Pallets — Perfect Condition.....$1.85 ea.

Also, plenty of corners, corner sash and specials in stock. Add 10c to above prices, send tracing or sample pallet for quotation.

If we don't have your size in stock, we usually know where to get them.

BLOCK MACHINES

1—Stearns, Model A, Clipper Stripper, complete, perfect condition	$ 995.00
1—Stearns, Model A, Clipper Stripper, complete with Rock Face Attach.	800.00
1—Kelly Tamper	300.00
1—#9 Joltcrete, with Air Off Bearer, Automatic Carriage	3500.00
1—Roy Darden Rockercrete, 8000 pallets, Anchor Brick Machine, Clipper Masonry Saw, Steam Curing Boiler, and Oil Furnace	5000.00
1—FC George, Hydraulic Block Machine, Mixer and Conveyor, 2700 8" pallets, 1000 4" pallets.	1500.00
2—Gravely Block Machines, less motors....each	350.00
3—Stearns Clipper 4" Mold Boxes, includes Stripping Fingers & Feet .....each	165.00
8—#7 and #9 Mold Boxes, various sizes....each	300.00
1—Brick Attachment, #7 Joltcrete and 1500 steel pallets	750.00
1—Automatic Carriage #7 Joltcrete .....each	250.00
2—Air Offbearers .....each	250.00

CONCRETE MIXERS AND SKIP LOADERS

1—30 cu. ft. Kelly and Stearns 28 ft. Skip	$2100.00
1—28 cu. ft. Stearns Concrete Mixer	1500.00
3—1 Bag Mixers, as is.....each	100.00
1—Continuous Mixer—George C. Christopher...	200.00

MISCELLANEOUS

20—Steel Racks 64 and 72 Block Capacity..each	$ 15.00
60—Steel Chase Racks, 52 Block Capacity..each	15.00
10—Steel Racks, 72 Blocks, Hinged Type..each	15.00
1—Barrett Craven Hydraulic Lift Truck.....	195.00
4—Hydraulic Lift Trucks .....each	125.00
1—Erickson, Fork Lift, 6000 lb. capacity.....	1800.00
1—Truckman Power Lift Truck.....	450.00
1—Hyster Fork Lift Truck, 7500 lb. capacity.	4500.00

WE BUY COMPLETE CONCRETE BLOCK PLANTS

WRITE WIRE PHONE

GENERAL ENGINES COMPANY

Used Equipment Division

307 HUNTER STREET, DEPT. PQ

GLOUCESTER, NEW JERSEY

Phones: Gloucester 6-1337 and 1338

how white is white?

"...whiter than new snow on a raven's back..."

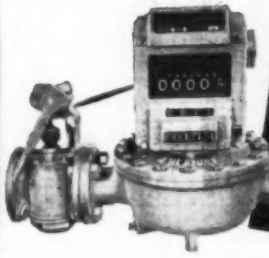
Shakespeare

Use Trinity white—the whitest white cement. Trinity white is a true portland cement. It meets all Federal and ASTM specifications. Use Trinity white for architectural concrete units, terrazzo, stucco, paint, ornamental work, tile setting, etc. Ask for it by its full name Trinity white.

Trinity Division, General Portland Cement Co.,
111 W. Monroe St., Chicago; Republic Bank Bldg., Dallas;
816 W. 5th St., Los Angeles.

Trinity White!

PORTLAND CEMENT



NEPTUNE AUTO-STOP METERS

ACCURATE WATER CONTROL —Automatically

Accurate Auto-Stop meters are the quickest, most dependable way to control water in ready-mix batches. Just push buttons to set the quantity, open the valve, and the Auto-Stop does the rest. It automatically shuts off when the correct amount is delivered. Saves work, speeds loading. Large, easy-to-read numerals. Sturdy, weatherproof register has emergency stop, quick resetting, and totalizing features. Sizes for all ready-mix plants. Write for quick facts, or phone our nearest branch.

NEPTUNE METER CO. • 50 WEST 50th STREET • NEW YORK 20
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Put LITH-I-BLOCK In Your Profit Picture

"I've had five different block machines and I know that Lith-I-Block is profitable. My two block L-3 produces 18,000 quality blocks in a 40 hour week. That kind of production insures a profitable operation."

FRANK KIRCHNER
F. F. Kirchner Co., St. Louis, Mo.

HUNDREDS OF SUCCESSFUL BLOCK MANUFACTURERS PREFER LITH-I-BLOCKS SUPERIOR PRODUCTION.

Write for complete costs and specifications.

LITH-I-BAR
LITH-I-BLOCK
LITH-A-TEX

LITH-I-BAR COMPANY
HOLLAND, MICHIGAN DEPT. CM-7

IT'S BIG • IT'S FACTUAL! • IT'S COMPLETE!

1951 *Edition* CONCRETE INDUSTRIES YEARBOOK

Largest in its History... incorporating all the latest available information on machinery equipment and processes

Thoroughly Re-edited—Pages of New Information

Because of the rapid growth of the industry in the past few years, and the important technological developments which have accompanied that growth, the Yearbook has been re-edited from front cover to back. Pages of new information, drawn from the experiences of the industry's outstanding producers, have been added to make this edition more than ever the indispensable text book of the concrete field.

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Established producers and newcomers alike will find in this bigger and better Yearbook a wealth of well-arranged, specific operating information to assist them in solving production problems and increasing profits. Plant design, the selection and characteristics of raw materials, batching, mixing, curing, handling and marketing are just a few of the important subjects treated.

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When new plants are built, when equipment requires replacement, or when existing plants require modernizing and expansion, experienced operators unfailingly turn to The Concrete Industries Yearbook for the know-how information they must have. Today, just as when it was first published 13 years ago, the Yearbook is absolutely unique in its field. And in every year since its inception the demand for copies has far exceeded supply.

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With every producible block, joist and cubic yard of concrete desperately needed today to ease the most severe housing shortage this nation has ever known, you will want more than ever to have on your desk this practical, down-to-earth guide to better production and higher profits.

So place your advance order now and avoid the risk of being disappointed. The supply will be limited, and distribution will be on the first come, first served basis.

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For the attached check, send me ..... copies of the 1951 edition of the Concrete Industries Yearbook.

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MULTICO BLOCKMASTERS

they've got everything!

MULTICO BLOCKMASTERS *have got* everything the modern operator wants. Multiplex engineers build FULLY AUTOMATIC machines with a compression action unavailable elsewhere; a combination of VIBRATION, TAMPING AND PRESSURE for perfect blocks. They chose HYDRAULIC POWER for smoothness of action and originated the idea of making a SEPARATE POWER PAK CONTROL unit for easy maintenance and simplicity of design. The Blockmasters have INDIVIDUAL MOLD BOXES for instant block-style change, coupled with PLAIN PALLETS for making ANY SIZE and ANY SHAPE of block out of ANY AGGREGATE. Both of these TWO MACHINES, the 2-block cycle MULTICO No. 2, and the 3-block cycle MULTICO No. 3, have STANDARD REPLACEMENT PARTS.

This is what John P. Kocak, Manager of the Lorain Crystal Ice Company, Lorain, Ohio, wrote us—

"It (MULTICO No. 2) has given us very good results, the block being the best we ever produced; they're dense, sharp, and test beyond requirements. Production is at a rate of between 450 to 480 block per hour."

Multiplex engineers want to help you plan your plant expansion, and can offer you the automatic block machines, mixers, skip hoists and compartment aggregate bins that are required for successful plant operation.

MULTIPLEX Machinery Corp • Elmore, Ohio

AVAILABLE IMMEDIATELY!

TAP THE PROFITABLE LINTEL MARKET NOW

Yes, we believe you'll be grateful if the steel shortage forces you to investigate concrete lintels, the vast market for them and the fast, economical method of producing them on the

KENT Lintelator

These lintels, with texture to match the blocks, are produced more economically than by any other method. Skilled help is not required. It is unnecessary to employ steel erectors, avoiding the extra expense and delay this entails. Builders like them and buy them once their availability is known. This is evidenced by repeat orders being received for LINTELATORS from purchasers throughout the country.

What are you doing about the LINTELATOR and the lintel market? If you haven't looked into the matter, isn't it wisdom to do so without further delay? Write at once for bulletin.

Write for Special Bulletin Describing:

SUPER LINTELATORS	STANDARD LINTELATORS
Make lintels 7⅝" HIGH by 3⅝" 5⅛" 7⅝" 9⅝" 11⅝" WIDE in these lengths.	Make lintels 7⅝" HIGH by 3⅝" 5⅛" 7⅝" WIDE in these lengths.
S 6.....2'8" up to 6'	No. 6....2'8" up to 6'
S 7.....2'8" up to 7'4"	No. 7....2'8" up to 7'4"
S 8.....2'8" up to 8'8"	No. 8....2'8" up to 8'8"
S 9.....2'8" up to 9'4"	No. 9....2'8" up to 9'4"
S10.....2'8" up to 10'8"	No. 10...2'8" up to 10'8"

The KENT MACHINE CO. Cuyahoga Falls, Ohio Concrete Products Machinery Since 1925

$WEET MU$IC FOR VIBRAPAC OWNERS

OSWALT SERVICE

adds at least $60.00 per day to the income from a vibrapac machine by increasing production from 600 to 900 blocks per hour *without sacrifice of quality.*

40 SATISFIED CUSTOMERS operating 54 machines.

Here's What One Customer Says:

"We are now turning out 940 top quality units per hour, and our vibrapac runs as slick as a sewing machine. We produced almost 2¼ million blocks last year in a one-shift operation."

(Name on request)

These extra profits are "sweet music" to vibrapac owners, because they are based on permanent factors of . . .

Greater Plant Efficiency
Lower Operating Expense

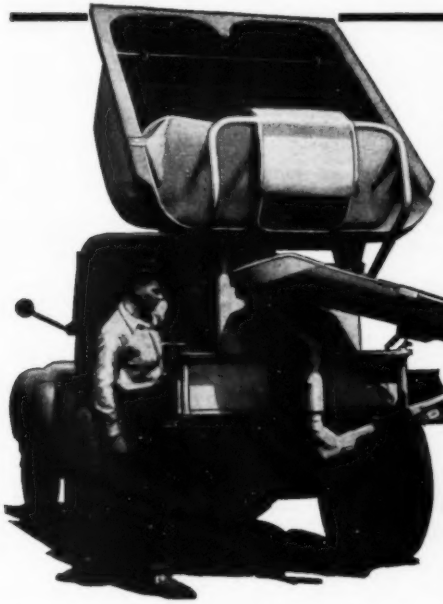
OSWALT SERVICE pays for itself in a few months' time through proven savings in concrete block manufacture.

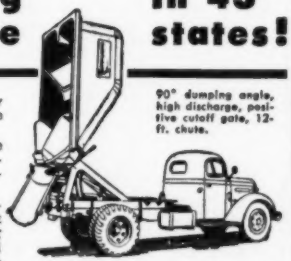
WRITE or PHONE for name of the Oswalt-Serviced plant nearest you.

Ask for our new booklet,
OSWALT SERVICE

OSWALT ENGINEERING SERVICE CORP., 1335 Circle Ave., Forest Park, Ill.
Phones: EStebrook 8-3666 — COlumbus 1-7073 — FOrest 6-3898

Today the DUMPCRETE is hauling concrete in 43 states!





90° dumping angle, high discharge, positive cutoff gate, 12-ft. chute.

Concrete men all over the country have found out that the Dumpcrete hauls good concrete at low cost.

They have learned how to produce better concrete cheaper with a central mixing plant, air-entrained concrete, and the Dumpcrete.

This low-cost way to produce top-quality concrete is used with great success by ready-mix and building supply companies, by highway and industrial contractors, by house builders and heavy construction concerns, and by local, state and national government agencies.

They are hauling concrete over 45 minutes without agitation and without segregation. They are dumping into buckets, hoppers and forms without a ramp. They are placing lower slump, easy-to-work concrete right where it's wanted with a 12 ft. chute.

They are using the Dumpcrete as a utility body, too . . . to haul sand, gravel, excavation, mortar, coal and bulk cement.

Their costs are low. Their production is high. No wonder they like the Dumpcrete.

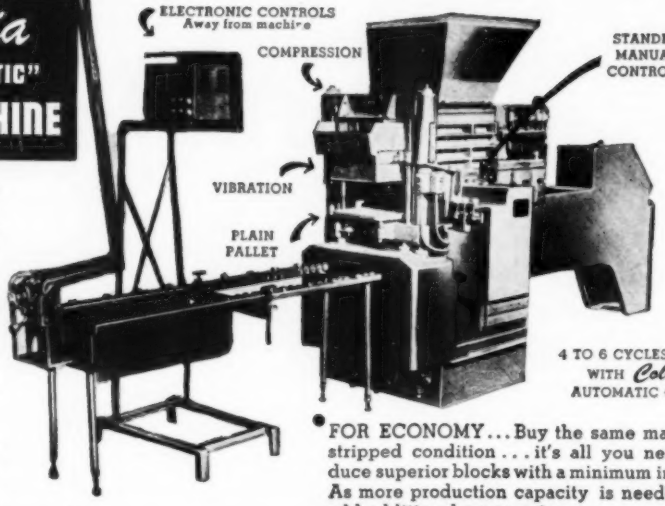
You will want to learn more about the new and improved Dumpcrete. Send the coupon today.

DUMPCRETE
DIVISION, MAXON CONSTRUCTION COMPANY, INC.
608 TALBOTT BUILDING, DAYTON 2, OHIO
Send Booklet "Dumpcretes Place Concrete at Lowest Cost"

Name_____
Firm_____
Street_____ City_____

NOW... COLUMBIA FEATURES ELECTRONIC CONTROL!

Columbia
"FULLY AUTOMATIC"
BLOCK MACHINE



Adjustable Electronic controls give this rugged, dependable, plain pallet machine a flexibility of operation unheard of before in the block industry!

Manual control is not sacrificed...the operator can easily switch from automatic to manual.

The Columbia produces precision blocks at a high rate of speed...it's easy to install and inexpensive to maintain.

Write today for complete information about this LOW COST, high production unit.

FINANCING AVAILABLE.

4 TO 6 CYCLES A MINUTE WITH *Columbia* AUTOMATIC CONTROL

FOR ECONOMY... Buy the same machine in a stripped condition... it's all you need to produce superior blocks with a minimum investment. As more production capacity is needed, simply add additional accessories.

COLUMBIA MACHINE WORKS 107 S. GRAND AVE. VANCOUVER, WASH.

COLORS

SYNTHETIC CONCENTRATED

RED

YELLOW **BLUE**
GREEN **BROWN**

BLACK

Color Card on Request

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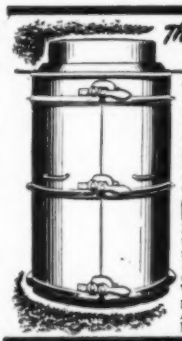
15 E. 26th St., New York 10, N. Y. Factory Bethlehem, Pa.



The "Quinn Standard"
FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request. Also manufacturers QUINN CONCRETE PIPE MACHINES.

QUINN WIRE & IRON WORKS 1627 12TH ST. BOONE, IOWA

Why

Spend good money for an obsolete low pressure steam curing system

When

For the same or less money you can get a modern high pressure steam curing system.

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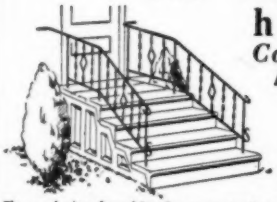
NOW MORE THAN 110 LICENSED MANUFACTURERS Producing



Patented
homeward
***Concrete* STEPS**

A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

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ROGER F. WILLIAMS, Licensor

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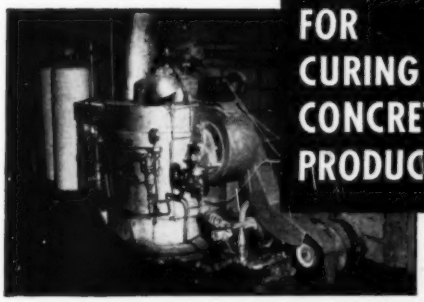

FOR CURING CONCRETE PRODUCTS

LITTLEFORD
"Kwik-Steam"
Vapor Generators

Curing of Concrete Products now can be done at the minimum of cost by using a Littleford "Kwik-Steam" Vapor Generator. These small, compact units are the fastest steam producing generators ever designed. They will produce steam in 2 minutes time from a cold start, are low cost in operation as they burn fuel oil and only produce steam when steam is needed. The "Kwik-Steam" Generators are completely automatic; no special trained operator is needed to run the Generator. Made in models to fit any size curing room. Sizes from 20 to 165 B.H.P.

LITTLEFORD BROS., INC.
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Quick Profits With The

MARVEL JR.
CONCRETE DRAIN TILE MACHINE

Produce flat-end drain tile in various sizes and combinations at record low cost. Quick profits for you in steady paying business, demand far exceeds production. Machine ready for use when it arrives—will pay for itself and a profit in a few days. Write for Drain Tile Bulletin.

WE ARE LARGEST MAKERS—Aluminum molds for making ornamental concrete products for gardens, parks, highways, etc. Birds, Animals, Globes, Urns, many others. Send for catalog.

CONCRETE MACHINERY CO.
P. O. Box 2248 **Hickory, N. C.**

Advertise
Your "Wants"
and
Surplus
Equipment

---

with truck-man !"

And that's not hay! That's what block plant operators across the country tell us they save with this economical, rugged truck. One man's time . . . every day . . . the whole year 'round . . . *that* adds up!

You save up to $300.00 and more during the first month you put Truck-Man to work in your block or brick yard . . . and you continue to save at that rate during years of faithful, dependable Truck-Man service.

Truck-Man is a light, speedy, highly maneuverable truck that works a shift on little more than a gallon of gas . . . requires minimum maintenance . . . has simple controls any worker quickly learns to operate. The special 62" platform handles even 72 block racks . . . those extra big loads that mean more profit per trip between block machine and curing room. Various platform heights, widths and lengths available to suit your operation.

There's an extra dividend for you, too, in the gentle treatment your blocks get. Truck-Man's easy hydraulic lift and drop, soft *start* and *stop*, and rubber-cushioned ride spot your racks gently . . . no costly checking of green blocks to eat up profits.

New 1951 catalog describes three low-cost Truck-Man models. You owe it to yourself to get the whole story on this money-maker. Coupon brings your copy, at no obligation. Mail it now. Sales and service in 95 centers across the nation!

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Increase BLOCK Output with a Sturdy Erickson

The Platform Truck "Custom-Built" for your racks—from 60 to 108 or more 8x8x16 blocks.

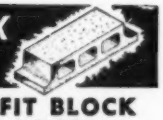
"THE BACKBONE OF BLOCK PRODUCTION" is what users still call the Erickson Platform Truck. Its rugged dependability to handle loaded racks from block machine to kiln assures top speed production with no delays or shut downs. The Erickson platform picks up all racks from the ends and places them close together in the kiln — no wasted space. For faster operation Erickson now offers 4 speeds forward, 4 speeds reverse.

We will build you a truck exactly suited to your racks and doorways. Also fork-type trucks. Write us—explain your needs.

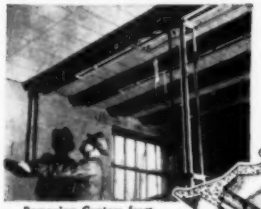
Erickson POWER LIFT TRUCKS, Inc.

1403 Marshall St. N. E. • Minneapolis 13, Minn.

SELL MORE BLOCK ON EVERY JOB!

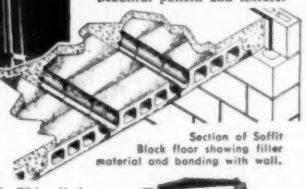


Furnish VIBRAPAC SOFFIT BLOCK for ALL FLOORS and ROOFS



Removing Centers from Finished Floor.

Permanent, Fireproof Floors and Roofs. Low initial cost and maintenance. Natural base for radiant heat installations. Provide surface of maximum acoustical and insulation value. Can be plastered, or if left exposed, makes a ceiling of beautiful pattern and texture.

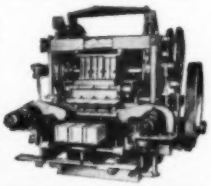


Section of Soffit Block floor showing filler material and banding with wall.

Soffit Block are supported in place with temporary adjustable steel centers while reinforced concrete slab is placed and cured. This eliminates timber shoring and leaves space below clear during construction.

BESSER VIBRAPAC PRODUCES SOFFIT FLOOR AND ROOF UNITS

The same machine that produces high quality concrete masonry units in all styles and sizes, using Plain Pallets. Continuous, full capacity operation. Fully automatic. No machine operator required.



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ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Products Plants

A 5867-¼R2

CONCRETE MANUFACTURER

RESEARCH DEPARTMENT

538 South Clark Street Chicago 5, Illinois

Please send me catalogs and prices concerning the following items checked below:

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- ☐ Air Compressors
- ☐ Air Entraining Agents
- ☐ Automizers
- ☐ Bag Cleaners
- ☐ Batchers
- ☐ Batching Plants
- ☐ Belting (Rubber)
- ☐ Bin Gates
- ☐ Bin Level Controls
- ☐ Bins and Batching Equipment
- ☐ Blades, Masonry Saw
- ☐ Block and Brick Machines
- ☐ Bollers
- ☐ Bucket Loaders
- ☐ Buckets, Concrete
- ☐ Buckets, Elevators
- ☐ Buggies, Concrete
- ☐ Bulk Cement Handling Equipment
- ☐ Bulk Cement Storage Plants
- ☐ Calcium Chloride
- ☐ Car Pullers
- ☐ Colors, Cement and Mortar
- ☐ Conveyors, Belt
- ☐ Conveyors, Portable
- ☐ Conveyors, Screw
- ☐ Curing Agents
- ☐ Curing Equipment
- ☐ Cutters, Bar
- ☐ Dispersing Agents
- ☐ Flooring Systems
- ☐ Forms, (Pipe, Joist, Ornamental, etc.)
- ☐ Guns, Color Spray
- ☐ Hardening Agents
- ☐ Heaters, Concrete Mixer
- ☐ Hoisting Equipment, Concrete
- ☐ Hoppers
- ☐ Joist & Slab Machines
- ☐ Kilns, Curing Concrete
- ☐ Lift Trucks, Electric
- ☐ Lift Trucks, Gasoline
- ☐ Lift Trucks, Hand
- ☐ Lightweight Aggregates
- ☐ Motors, Entrained Air
- ☐ Motors, Water
- ☐ Meters, Sand Moisture
- ☐ Mixers, Concrete (Batch)
- ☐ Mixers, Concrete (Continuous)
- ☐ Mixers, Truck
- ☐ Mixing Plants, Central
- ☐ Molds, (Pipe, Joist, Ornamental, etc.)
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- ☐ Reinforcing Equipment
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- ☐ Scales
- ☐ Silo Stave Machines
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- ☐ Skip Loaders
- ☐ Tamping Equipment
- ☐ Tile Machines, Drain
- ☐ Tile Machines, Roofing
- ☐ Tractors
- ☐ Truck Bodies, Ready-Mixed Concrete, Non-Agitating
- ☐ Turntables
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ADDRESS .....

CITY ..... STATE .....

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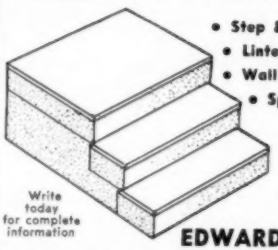


- Step & Entrance Platforms
- Lintels & Sill Forms
- Wall Coping Forms
- Splash Block Forms
- Date Block Forms
- Chimney Caps, Etc.

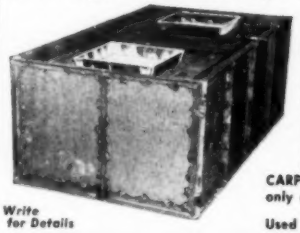
Sold Outright
No Franchises Needed

Write today for complete information

EDWARD CAMPBELL CO.

S. E. Corner East & Walnut Rd. Vineland, N. J.

Build Septic Tanks *FASTER - BETTER - CHEAPER*



CARPENTER

Forms and Equipment enable any concrete producer to make *additional* profits from a quality product in demand everywhere. High speed handling throughout. CARPENTER Delivery Rig needs only *one man*.

Write for Details

Used from coast to coast

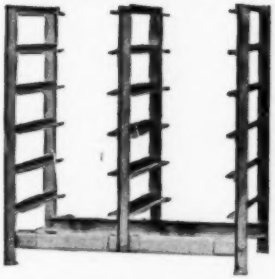
CARPENTER MANUFACTURING COMPANY

Phone 22018 Richmond

R.F.D. No. 1, Box 470 Virginia

CHASE BLOCK RACKS, CARS, PALLETS

Corrosion-Resistant Hi-Strength Alloy Steel



For Fork or Platform Lift Trucks

CHASE — THE LAST WORD IN
- DURABILITY
- ECONOMY
- EFFICIENCY

Sturdy construction
•
any style or capacity
•
Shipped knocked down
•
Rigid Field connections
•
assembled Easily

CHASE Foundry & Mfg. Co.
COLUMBUS 7, OHIO

SAFE HANDS LOSE NO TIME

Natural-rubber* treaded

Grab-it

Non-slip grip, wet or dry; extra protection against cuts; and 5 to 10 times longer wear

Rubber-Treaded wearing surface wears like a tire. Far outlasts higher priced leather.

Non-Skid: Rough surfaced, waterproof rubber grips firmly, safely, easily—wet or dry.

Strong, Comfortable Fabric lining and back. Feels like any canvas glove. Flexible.

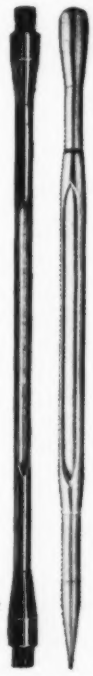
Big, Full Hand Size with elastic on back to fit snug on any hand.

Ideal for handling bagged cement, concrete block, etc.

* Also NEOX (reinforced neoprene) and plastic coatings, over-all or palm-and-thumb only. Gauntlet, safety cuff and knitwrist styles.

Smart management supplies good work gloves
Safer, more comfortable coated-fabric gloves speed work handling, reduce lost-time accidents, improve comfort and job attitude. *And cost less because they wear far longer.*

Edmont Mfg. Co., 1208 Walnut St., Coshocton, O.
World's largest maker of coated industrial gloves



WOOD'S
Ready-Mix Concrete Thermometer

These Thermometers are furnished with or without the Loggins shield for the protection of the glass, and can be supplied with point in one end and ⅜" coupling for connection to iron pipe on other end, or with coupling on either end.

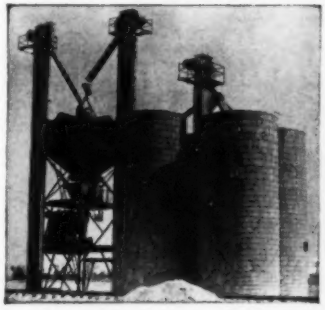
Dimensions — 19" x ½"
Range up to 230 Degrees

These instruments are enclosed in steel armor plated and chromed so as to be rust proof, and of high-grade glass thermometers, carefully assembled with padding that cushions and holds the glass thermometer in the rigid *steel* armor.

PRICES
19" Without shield $12.00
19" With shield $15.00
F.O.B. Atlanta, Ga.

The A. A. Wood & Sons Co.
P. O. Box 937 Atlanta 1, Ga.

Sand and Gravel Store Best-



Handle Easiest- in a MARIETTA

The indestructible combination of concrete reinforced with steel makes a MARIETTA storage system rugged enough to handle heavy materials like sand and gravel. Its air-tight interior keeps out all traces of moisture. Special construction features, including well planned chutes, make filling and handling easy.

These systems are flexible enough to be tailored to your volume requirements. They are quickly and carefully erected by our own crews. They are often ready for filling within a week after order is received.

Write or wire our nearest office for full information.

The MARIETTA Concrete Corporation
MARIETTA, OHIO

Branch Offices:
[redacted] Race Rd. & Pulaski Hwy., Baltimore 21, Md.
Box 1575 Charlotte, N. C. [redacted]

Check these Features

- **Finger-tip single valve control for easy operation.**
- **Variable speed drive on hydraulic pump.**
- **Timken bearing-equipped turntable, grease-sealed for life, with automatic locking.**
- **Easily replaced packer shaft, mounted on lifetime Timken bearings, with oversize stuffing box to protect against sand and grit.**
- **V-Belt and chain drive throughout, with oversize Twin Disc clutches.**
- **Square drive shaft for greater strength and easily obtainable replacement.**
- **Fewer lubrication points, with only four points requiring daily lubrication.**
- **Makes 3 and 4 foot joints up to 18" Diameter. Quick change from one size to another.**

These are just a few of many outstanding features of Dixon Model "C" Hydraulic Pipe Machines . . . features that mean money in your pocket because they contribute to faster production, lower operating costs, better pipe and higher profits. Write today for complete information.

HOUSTON CONCRETE MACHINERY COMPANY

Plant: 6600 Washington Avenue
Office and Mailing Address: 116 Heights Blvd.
HOUSTON, TEXAS

Manufacturers of:

Dixon Pipe Machines
Pipe Bend Machines
Dixon Mixers

Dixon Conveyors
Off-Bearing Carts
Septic Tank Forms

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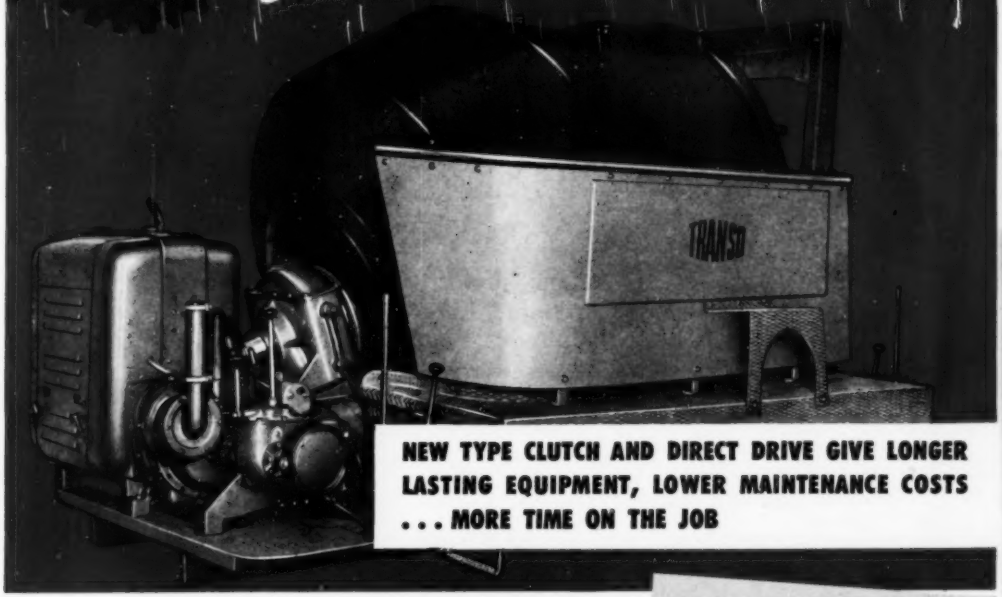
TRANSO Mixer DIRECT Drive STOPS SHOCK LOADING!



NEW TYPE CLUTCH AND DIRECT DRIVE GIVE LONGER LASTING EQUIPMENT, LOWER MAINTENANCE COSTS . . . MORE TIME ON THE JOB

Transo's Truck Mixer Drive, Model D-51, has a planetary type reverse transmission with spring loaded automotive-type clutch running in oil to eliminate all shock loads. Two discharge and two mixing speeds. SMOOTH starting and discharge reversing are automatic. The drive is directly coupled to the mixing drum through a large UNIVERSAL JOINT SPIDER, eliminating ring gears, sprockets, and drive chains. Built-in water pump has separate spring loaded clutch.

FOR ALL MIXERS

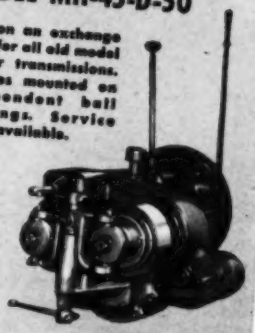
The Truck Mixer Drive fits all sizes and models of Blaw Knox, Jaeger, Smith, Rex, and Ransome mixers.

EXTRA ADVANTAGES

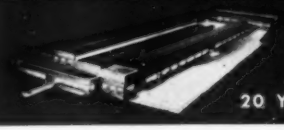
Transo's design virtually eliminates adjustment and lowers maintenance costs. Clutch is self-adjusting. Automatic brake for mixing drum. Available with FLUID COUPLING or TRANSO TORQUE CONVERTER and your choice of engines.

TRANSO REPLACEMENT TRANSMISSION MODEL MH-45-D-50

Sold on an exchange basis for all old model Jaeger transmissions. Clutches mounted on independent ball bearings. Service parts available.



A FEW TERRITORIES ARE STILL AVAILABLE TO QUALIFIED DISTRIBUTORS



THE TRANSMISSION & GEAR CO.

10421 HAGGERTY AVE. • DEARBORN, MICH.

20 YEARS' EXPERIENCE BUILDING TRUCK MIXER TRANSMISSIONS

PARKWAY CINDER BLOCK & BUILDING MATERIAL

SAM ROSSELLI

741-745 ROCKAWAY PARKWAY
BROOKLYN 36, N.Y.
HYACINTH 3-0400

May 8, 1951

Stearns Manufacturing Co., Inc.
Adrian, Michigan

Gentlemen:

We have been operating our Stearns Model 50 automatic block machine for a year and in that short time have gained a reputation for the highest quality, best looking block in our Area.

We have operated three different machines in the nine years we have been in the concrete products business and our records show that with our Model 50 we are producing 500 8'' units per hour at the lowest labor and upkeep cost in our history.

Our machine was the first Model 50 in the New York City region and we have recommended, and will continue to recommend the ''50'' to the many Concrete Block Manufacturers who visit our plant to see the machine in operation.

Very truly yours,

PARKWAY CINDER BLOCK & BUILDING MATERIAL

Sam Rosselli

SR:es

Owner

This first Stearns 50 in the New York City region is serving the Brooklyn area with 4000 highest quality blocks per day at a marked saving to the owner, Sam Rosselli, who here tells the Concrete Block-Making World of its outstanding, dependable performance. Fully Automatic • One-man—2-blocks-per-cycle • Vibration under Pressure.

STEARNS 50

"...LOWEST LABOR AND UPKEEP COST in our history"

Sam Rosselli, center, owner of Parkway Cinder Block and Building Material, after an eight-year struggle to keep his costs down and his reputation up, using other makes of concrete block machines, found the answer just a year ago in the *extra sturdy, extra rugged,* Stearns 50. Also in the photo, are John Genoese, Parkway's production superintendent, and Esther Skluth in charge of the office.

•

Block with "a reputation for highest quality" —"best looking block in our area." A corner of Parkway's yard in Brooklyn, below. Mr. Rosselli is getting new customers every day, despite the fact that there are two competitive plants within walking distance!

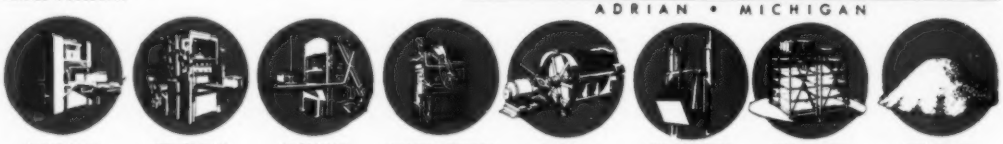
PERFORMANCE IS PERFECTION—PERFECTION IS PROFIT!

MODERNIZE WITH A STEARNS! BACKED BY MORE THAN A QUARTER CENTURY OF KNOW-HOW!

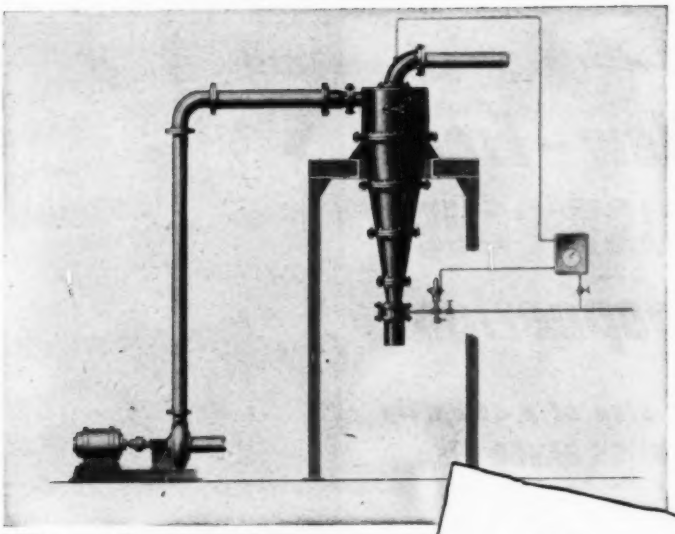
STEARNS

MANUFACTURING COMPANY • INC

ADRIAN • MICHIGAN



STEARNS 15 | STEARNS 50 | JOLTCRETES | CLIPPER STRIPPERS | MIXERS | SKIP LOADERS | TURNTABLES | SINTERLITE



how good is a DorrClone* on desliming operations?

Results of independently run tests** on a 24" diameter DorrClone at a typical Florida phosphate rock washer show high recovery of wanted fraction—high elimination of slimes — remarkably constant discharge density.

Summary of Cumulative Results

Cum. Sample Number	Sampling Period in Hrs.	Feed % Solids	Underflow % Solids	Overflow % Solids	Underflow +200 Rec.	Overflow −200 Elim.	Feed T.P.H.
#1	7.0	14.1	70.2	6.5	97.14	89.27	32.8
#2	3.5	22.1	69.8	5.8	93.88	97.07	36.9
#3	6.0	13.3	67.2	4.4	97.23	88.07	25.5
#4	5.5	28.7	76.6	5.1	97.55	93.24	41.4
#5	6.5	14.2	72.8	5.5	96.83	90.64	33.8

PROBLEM

To desline minus 14 mesh washer debris for maximum recovery of plus 200 mesh material prior to concentration.

EQUIPMENT TESTED

24" diameter DorrClone equipped with Dorrco Vactrol* feature for automatic density control.

TESTING PROCEDURE

Cumulative samples of DorrClone feed, overflow and underflow taken on a half-hourly basis over a five-day period.

*DorrClone and Vactrol are trademarks of The Dorr Company.

**Name and location upon request.

Regardless of material processed, the DorrClone can handle your desliming problem. Write to The Dorr Company, Engineers, Barry Place, Stamford, Conn., or in Canada to The Dorr Company, Engineers, 80 Richmond Street West, Toronto 1.

DORRCO

DORR

WORLD-WIDE RESEARCH · ENGINEERING · EQUIPMENT

THE DORR COMPANY · ENGINEERS · STAMFORD, CONN.
Associated Companies and Representatives in the principal cities of the world

Now—Free TRUCK SAVER *Inspection*

First step of a complete TRUCK SAVER *plan*

- **Available to all International Truck owners**
- **No cost, no obligation for a 99-point checkup**
- **For a limited 3-month period ending September 30**

How easily you can keep your Internationals operating at peak efficiency in an uncertain future may depend on what you do within the next 90 days.

If you take advantage of our Truck Saver Inspection, you'll be taking the first step toward putting your Internationals in shape for the "come what may" days ahead.

Since this inspection doesn't cost you a penny, you have everything to gain—nothing to lose. You can save dollars now and perhaps many more before the end of 1951.

So get ready now to keep your trucks on the job despite shortages. The sooner you get your free Truck Saver Inspection, the sooner you see practical reasons why you should take advantage of our complete International Truck Saver Plan.

Look what the complete International Truck Saver Plan offers

The complete International Truck Saver Plan has been developed by experts, after a thorough study of today's truck operating problems. It offers these benefits to International Truck operators:

1. Better performance over a longer truck life: trucks are kept in shape to do the most efficient job possible until they can be replaced by new units.

2. Delays minimized in getting new parts: by anticipating future requirements, the demand for needed parts can be accurately estimated.

3. Maintenance costs cut, down time reduced: by preventing major breakdowns, a big saving is effected in both time and money.

4. Truck value maintained: trucks kept in the best possible condition are worth more when it's time for replacement.

Take advantage of the International Truck Saver Plan now

If you want to save yourself trouble and money in the months ahead, you belong in the International Truck Saver Plan.

Get your free Truck Saver Inspection—find out from your International Truck Dealer or Branch how the plan can help you keep your Internationals going at peak efficiency.

International Harvester Builds
McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks
Industrial Power . . . Refrigerators and Freezers

International Harvester Company • Chicago

INTERNATIONAL TRUCKS

Heavy-duty engineered for the long haul

Why Make a Mystery of Wire Rope Costs?

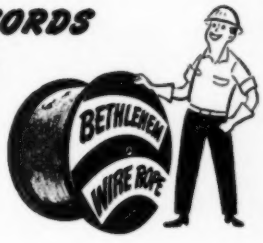
Every once in a while we run across somebody who's hopelessly confused about his wire rope costs. Sure, his books show him the total he spends each year—so much for this brand, so much for that brand, so much for a third. But he never really knows what he's getting from each brand in terms of work.

And work is what he buys with every cent he spends on rope. Work determines the cost—the *actual* cost.

He could easily clear things up by recording what each rope does . . . in terms of ton-miles, cubic yards of rock moved, or other simple, appropriate units. That would give him a basis for actual comparisons of costs and actual comparisons of brands.

Bethlehem has long recommended such a system, and more and more customers are using it. They have found it well worth the minor effort involved, for it's done away with guessing. They've found, too, in keeping such records, that every dollar spent on Bethlehem rope buys a mighty big dollar's worth of service.

LET YOUR RECORDS TELL YOU!

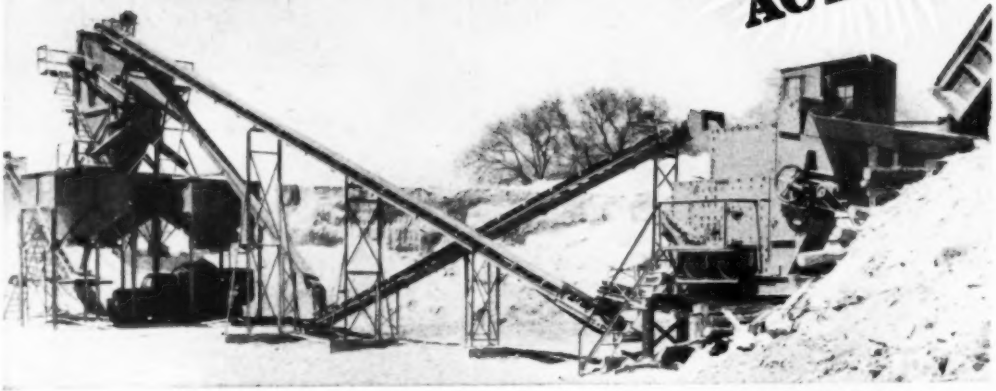


BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

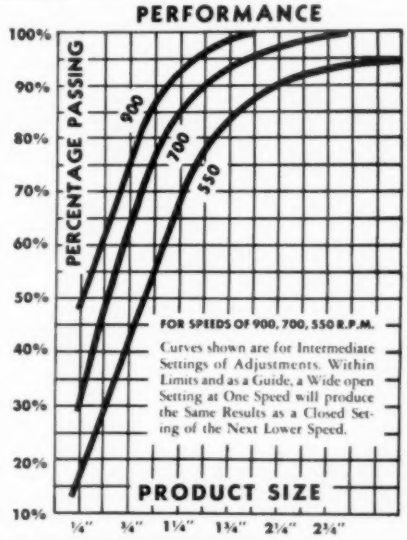
MAXIMUM PRODUCTION OF WANTED SIZES WITH CONTROLLED IMPACT ACTION



AN IMPORTANT ADVANTAGE OF THE PMCO IMPACT MASTER

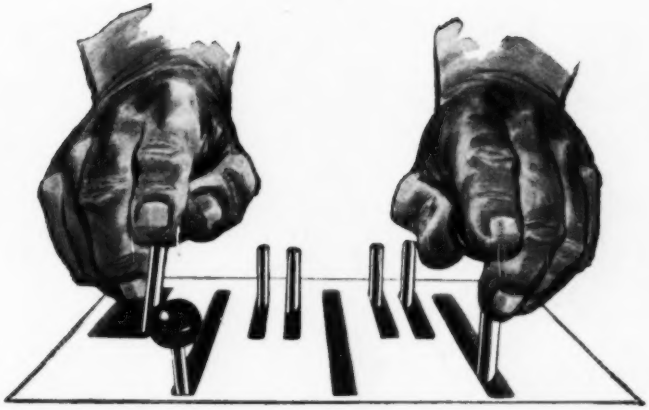
Operating a single 3240 Impact Master in a closed circuit set-up is mighty profitable for Dillon, Sharpe & Company, Columbus Junction, Iowa. In a free running operation they are averaging 28% of −1½ plus ¾, 38% of −¾ plus #4, and 34% aglime. By making simple adjustments on the Impact Master the percentage of sizes can be increased or decreased to meet demands. That's real flexibility. And what's more, when top production is required, the potential is there to produce over 225 tph.

Controlled Impact Action is the exclusive operating principle of the PMCO Impact Master. It makes possible a ratio of reduction that eliminates much accessory equipment, cuts power, labor and maintenance costs . . . and enables you to step into big production with a minimum investment. By controlling the in-fed rock and directing its flow practically 100% of the breaking is accomplished by rigidly mounted rotor hammers, producing a highly uniform gradation cubical product in one fast operation. Impact Masters are available with capacities to 500 tph. Get more facts and job proved figures. Write today for full information.



PETTIBONE MULLIKEN CORPORATION

4700 West Division Street, Chicago 51, Illinois Phone Spaulding 2-9300



At your fingertips... up to 25% increased output with SMOOTHER, EFFORTLESS *Speed-o-Matic* CONTROLS

LINK-BELT SPEEDER

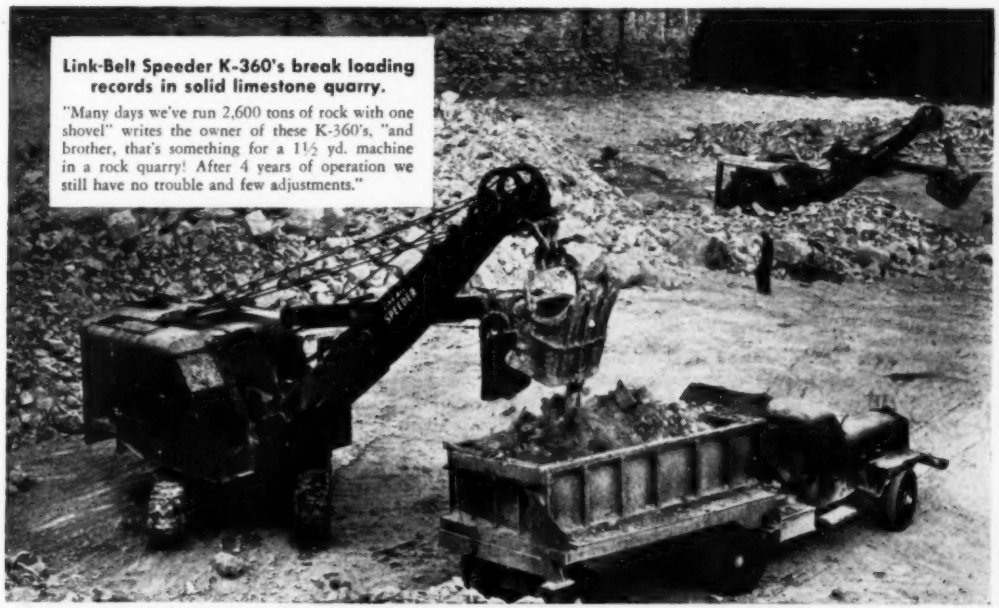
Fingers instead of muscles do the work, thanks to Link-Belt Speeder's remarkable, exclusive Speed-o-Matic* controls!

But there's more to this than ease of operation. Every move of Shovel-Crane is faster, surer—far more effortless. You get "pin-point" placement of bucket, shovel or hoe, and there's no drag or lag, jerk or jump. And for perfect control, you "feel the load" every inch of the way.

Operators praise the ease Speed-o-Matic controls provide. Say they keep far fresher, far more alert—even during long overtime. This pays off in greater output, more profitable operation for you.

When you're considering Shovel-Cranes—remember, only Link-Belt Speeders can offer you the amazing advantages of Speed-o-Matic *full* hydraulic controls. Look to Link-Belt Speeder for *more work*, more kinds of work, more of the time.

**On 51, 300 and 500 series*



Link-Belt Speeder K-360's break loading records in solid limestone quarry.

"Many days we've run 2,600 tons of rock with one shovel" writes the owner of these K-360's, "and brother, that's something for a 1½ yd. machine in a rock quarry! After 4 years of operation we still have no trouble and few adjustments."

LINK-BELT SPEEDER
CORPORATION

Builders of the most complete line of shovels, cranes and draglines
CEDAR RAPIDS, IOWA

12,400

Here is the reason

behind machine-gun camera photos like this BLAST!

Yes, this is a BLAST—and a good one, too! You see no puffs of wasted explosives gas or wild flying rock! And it's the *peak* of the blast. The rock has moved out 30 to 40 feet from the face, and is ready to drop in a well-broken heap, ready for the shovel.

We've taken hundreds of these pictures, showing several types of blasting—clicked off by our electric machine-gun camera at the rate of three per second. The reason behind them is to show what *really* happens when a blast goes off—so that you, our customer, can profit from better knowledge of results to be gained from different explosives, different loading and shooting methods.

This photo, for example, is one of 15 covering this blast of 22,000 pounds of Atlas explosives in a limestone quarry. It shows the ROCKMASTER Blasting System at its best. All 17 holes were detonated from the bottom, alternating ROCKMASTER electric detonators No. 1 and 2 (timed at average 17 milli-seconds apart).

Ask your Atlas representative to show you machine-gun camera photos of other types of blasting, so that you can gain from Atlas' wide experience in pioneering split-second delay blasting. Ask him, too, or write us, for the ROCKMASTER Booklet, showing typical loading diagrams for blasting rock, coal, ore . . . on the surface or underground.

Less Bark *More Bite*

ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U.S. Pat. Off.

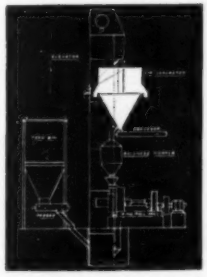
ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

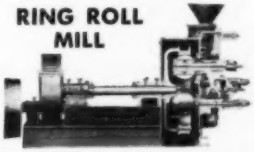
STURTEVANT AIR SEPARATORS

Produce Aggregates that meet Government Specifications



Sturtevant Air Separator in "closed circuit" with pulverizer. This combination increases tonnage and reduces costs in all types of industry.

RING ROLL MILL



Range 10 to 200 mesh. Use this mill in closed circuit with Sturtevant Air Separators.

On dam projects throughout the country, Sturtevant Air Separators are helping contractors meet U. S. Corps of Engineers specifications for proper analysis of aggregates. Here's how — Sturtevant Air Separators de-dust and remove the fine fraction according to the mesh required. Dry or damp sand can be handled in any tonnage desired in ranges from 30 mesh and finer to eliminate screen in the production of intermediate sizes.

The de-dusted sand of proper mesh is then inter-blended with the screened sand or aggregates in the proper proportions providing aggregates that meet specifications.

Sturtevant Air Separators are fast and accurate. They increase production of aggregates, cut production costs.

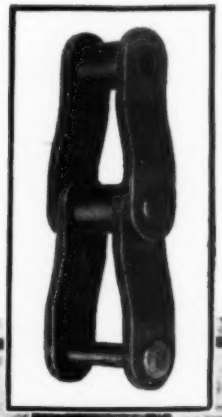
Investigate Sturtevant Air Separators for your jobs. Write for details, today.

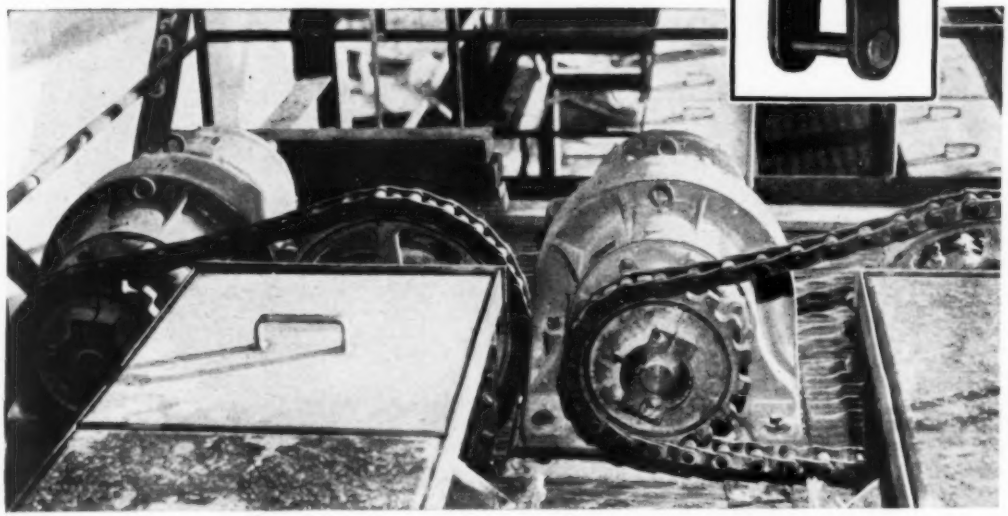
STURTEVANT MILL COMPANY

104 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS MECHANICAL DRYS and EXCAVATORS • ELEVATORS • MORE

GET MORE HORSEPOWER PER CHAIN DOLLAR





Rex Chabelco® Steel Chain is ideal for conveyor and bucket elevator drive service in pits, quarries and cement plants. Since these drives operate under heavy loads at low to moderate speeds, Rex Chabelco delivers more horsepower for each dollar of investment. Here's why:

First, for equivalent load, Rex Chabelco Chains and Sprockets are lower in original cost than other types of driving medium. Often a single strand Chabelco Chain will handle loads that require multiple strands in other types of drives.

Second, Rex Chabelco is lowest in overall operating cost and assures long overall drive life. It is a precision-built chain made of high carbon or alloy steel, heat treated for high strength and durability. Clearances are built in between chain parts, permitting exposed operation under severe conditions. Dust and dirt are far less likely to build up between chain parts and cause "freeze-ups." Heavy shock loads are easily accommodated. Maintenance is simpler . . . more economical.

Rex Chabelco Chains come in a wide variety of sizes and strengths. They are frequently used to replace cast chains of equivalent size where greater strength is necessary. They can often operate over the same sprockets as equivalent size cast chain.

Rex Chabelco Chain Drives are *easy* to select. For information, ask your local Rex Field Sales Engineer, or write to Chain Belt Company, 1604 W. Bruce Street, Milwaukee 4, Wisconsin.

Other Rex Favorites for Pit, Quarry and Cement Mill Service

Rex Durobar® Combination Chain

Rex Ley-Bushed Chain

Rex Style "A" Bucket

Baldwin-Rex® Roller Chain

CHAIN BELT REX COMPANY ®

CHAINS AND SPROCKETS

Today it's HENDRIX!

Men Who Watch Costs Specify

HENDRIX

Dragline

BUCKETS

3 TYPES FOR EVERY DIGGING PURPOSE

3/8 to 40 CU. YDS.

The records prove it . . . that Hendrix Dragline Buckets stay on the job longer and keep maintenance costs down. This is partially due to the all-welded construction . . . the design that eliminates "dead weight," yet strengthens the unit for unsurpassed performance on any job. In a large measure, too, it is the painstaking care, special engineering techniques and years of "know-how" that guard and maintain Hendrix's quality leadership.

Smart operators specify Hendrix Buckets again and again . . . they know!

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

Hendrix Buckets Also Available WITHOUT PERFORATIONS

HENDRIX MANUFACTURING CO., INC.

MANSFIELD – LOUISIANA

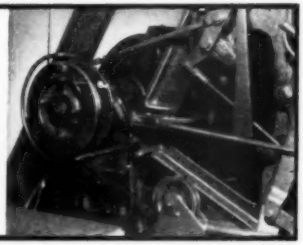
Another BAY CITY Shovel helping to rush completion of the New Jersey Turnpike

Contractor Louis J. Zimmerman of Hillside, New Jersey knows that it takes man-sized equipment to stand up under the tough production schedule of a big highway construction job. That's why he put his BAY CITY "65" shovel to work at a borrow pit for the New Jersey Turnpike. Like owners and operators everywhere, contractor Zimmerman knows that BAY CITY shovels are engineered from crawlers to boom point for rugged, heavy-duty operation and lasting service. They give you more power plus the extra weight and stability you need to turn out more work every day. Low operating costs mean bigger profits for you. See the many outstanding BAY CITY features at your nearest dealer or write today for complete information.
BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN

CHECK LIST

- Fully Convertible
- Long, Wide Crawlers
- Alloy Cast Bases
- Tandem Drums
- Power Booster Clutches
- High Line Speeds
- Wide Vision Cab
- Pin-Connected Boom

Fast-acting power dipper trip is another exclusive BAY CITY feature available on all shovels. It operates electrically or manually by a control located right where you want it—on top of the swing lever. There's no lost time groping for the trip rope—a time savings, operators report, that accounts for up to 25% more yards daily.



188

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

Can You Use These Facilities?

THE ALLIS-CHALMERS Basic Industries Research Laboratory is open for business — to help you work out profitable solutions to processing problems. It contains modern equipment for both batch and pilot mill tests in grinding, crushing, sizing, concentrating, jigging, pyro-processing, as well as chemical and physical analysis.

The Laboratory's purpose is to develop new or more efficient processing methods . . . to determine the economics of a process prior to full scale production . . . to provide engineering information to guide in the designing of efficient plants.

Use of the facilities of the laboratory are available to anyone in industry. Charges are based on costs. Estimates for test work can be obtained from the A-C district office in your area or by writing direct to Allis-Chalmers Research Laboratory, Milwaukee 1, Wisconsin.

HERE'S HOW LABORATORY SERVICE WORKS:

A manufacturer of rock products wanted to crush and grind a granite rock to produce material for roofing granules.

A considerable amount of equipment would be required, and before making this expenditure the company wanted to be sure that not too much material would be lost as fines in the process. It was estimated that a 50 percent recovery would be commercially practical.

The problem was brought to the Allis-Chalmers Basic Industries Laboratory for crushing and grinding tests. A ton of the granite rock was run through the Laboratory's pilot mill and a flow sheet was worked out which resulted in 70 percent recovery of finished product.

As a result of the tests, this manufacturer was able to proceed with confidence in setting up new equipment . . . with only a nominal expenditure for preliminary pilot plant testing.

ALLIS-CHALMERS

Basic Industries Research Laboratory — Dedicated to a Better Utilization of our Raw Materials

Free

Write Allis-Chalmers, Milwaukee 1, Wis., for Bulletin 07B6419B.

Name .....

Company .....

Position .....

Address .....

City ..... State .....

A-3338

NO COMPROMISE IN MM ENGINES

In selecting power that will stand up longer under heavy industrial loads, don't compromise—pick MM . . . the design that offers low speed with ample size and weight.

All MM engines are engineered to produce high torque at reduced speeds by efficient, *high turbulence* combustion and free-flow intake manifolds. This permits them to take sudden loads without stalling.

Rather than compromise high torque for higher horsepower at high rpm, MM heavy-duty engines are designed to deliver *consistent power . . . to take sudden loads in stride* without reducing the torque or twisting force. That is why MM Industrial Engines and Power Units give outstanding performance . . . are the preferred unit for crushers, draglines, shovels, generators, hoists, pumps.

SEE YOUR MM DEALER-DISTRIBUTOR, OR WRITE

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

LUBRICATION ECONOMY

"LUBRIPLATE No. 630-AA is Practically a Universal Lubricant"

The Spokane Portland Cement Company of Irvin, Washington writes, "With the introduction of LUBRIPLATE No. 630-AA we reduced the number of lubricants we were using from ten to two. LUBRIPLATE No. 630-AA might almost be considered a *UNIVERSAL LUBRICANT*".

1. LUBRIPLATE reduces friction and wear
2. LUBRIPLATE prevents rust and corrosion
3. LUBRIPLATE is economical to use

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N.J. Toledo 5, Ohio

The Different LUBRICANT!

DEALERS EVERYWHERE, consult your Classified Telephone Book

For Swamp and Salt Marsh Ditching You Can't Beat

LITTLE GIANT CRANES

No center pin to maintain — LITTLE GIANTS main machinery rotates on a ball-bearing turntable, which is unconditionally guaranteed for ten years.

Here's the LITTLE GIANT "Swamp Special" owned by Ocean County, New Jersey, Mosquito Control Commission. Two massive tracks, each 48" wide. 36 lower rollers, 10 upper rollers. Ground pressure 1.60 lbs. per square inch.

The LITTLE GIANT "Swamp Special" is ideal for use in salt marshes, Peat bogs, Tundra conditions experienced in Canada and Alaska, for reclaiming Everglades lands in Florida. There is no equal to this machine—it crosses salt marsh ditches 4' wide and 3' deep with ease.

There are a few choice territories open for real aggressive distributors, if interested write

LITTLE GIANT CRANE & SHOVEL, INC.
East 16th & Howard Drive Des Moines 13, Iowa

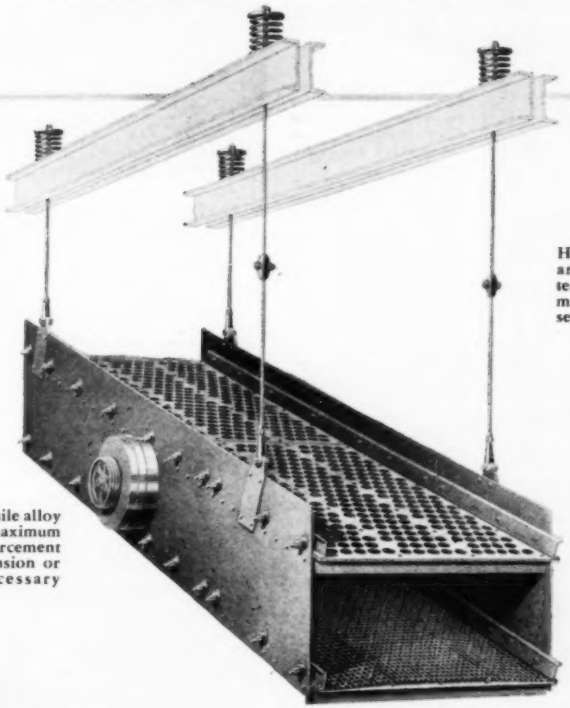
For accurate sizing...
For thorough rinsing...
For rapid dewatering...

the BETTER WAY is with CA

Concentric Action Vibrating Screens

No matter what your screening requirements — Link-Belt CA Vibrating Screens offer top efficiency. Self-aligning vibrator mechanism imparts a smooth, positive, circular motion to every square inch of every deck. Lively tumbling action gives each particle maximum opportunity for sizing, washing or drainage.

There's a standard size CA for almost every job — 3 x 8 to 6 x 16 ft. . . . single, double and triple deck . . . suspension or support mounted. Remember, when it comes to materials handling, profit-wise operators come to Link-Belt.



Two-bearing vibrator has constant bearing loads — no shock from impact of feed.

Unbalanced weights easily adjusted to amplitude of highest efficiency.

Screen box of high tensile alloy steel plate provides maximum strength. Solid reinforcement at vibrator and suspension or support insures necessary rigidity.

Husky roller bearings are completely protected from dust and moisture by labyrinth seals, steel housing.

Centrifugally-actuated, unbalanced weights eliminate excessive vibration in accelerating and decelerating.

Screen cloth is securely tensioned and clamped over rubber supports, can be quickly changed.

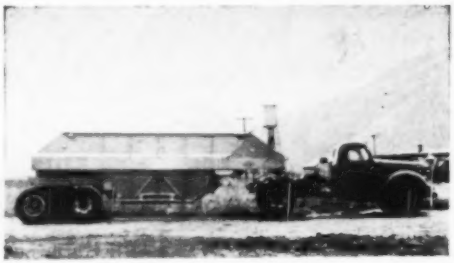
WRITE FOR BOOK 2354 for complete layout data

LINK-BELT

VIBRATING SCREENS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa.) Offices in Principal cities.

12.425



Landis 18 yard, off the road trailer. Overall length 23'9". Width 8'; height 8'. 2-door openings 1'8½"x11'9". Hopper of 3/16 high tensile steel. Tandem axle good for soft ground. Door opening by gravity, air closing from truck cab.

LANDIS TRAILERS CARRY MORE - MORE OFTEN!

With LANDIS TRAILERS in your fleet, you'll discover strong, smooth-surface construction permits heavier loading. Their end, side or bottom dump, plus safe, positive connection with quick response of controls mean faster, smoother, more efficient operation! Thus, you carry more per load — and you carry more loads per day! Check with LANDIS on the engineer-designed LANDIS TRAILER for your operations!

LANDIS STEEL CO.

Box 248 PICHER, OKLA. Phone 734

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save time . . . save money with

Ehrsam electric manlifts

Rapid inter-floor transportation reduces employee fatigue, cuts down accidents, saves the worker's energy for his job.

Tools and light repair parts can be carried to speed up repairs, cut down production loss from breakdowns.

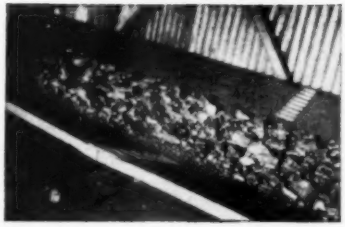
Pictured is the electrically operated, all-steel cage manlift made in 300- and 500-pound capacities. Write today for information about EHRSAM hand and electrically operated manlifts or employee elevators.

ADDRESS INQUIRIES TO Department P

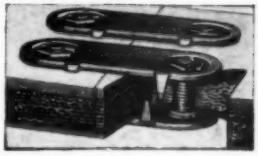
THE J. B. EHRSAM & SONS MFG. CO.

ESTABLISHED 1872 ENTERPRISE, KANSAS, U.S.A.

FLEXCO® BELT FASTENERS and RIP PLATES



FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH



Compression Grip distributes strain over whole plate area

- ★ FLEXCO Fasteners make tight butt joints of great strength and durability.
- ★ Trough naturally, operate smoothly through take-up pulleys.
- ★ Distribute strain uniformly.
- ★ Made of Steel, "Monel," "Everdur." Also "Promal" top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO.

4623 Lexington St., Chicago 44, Illinois

DEALERS WANTED

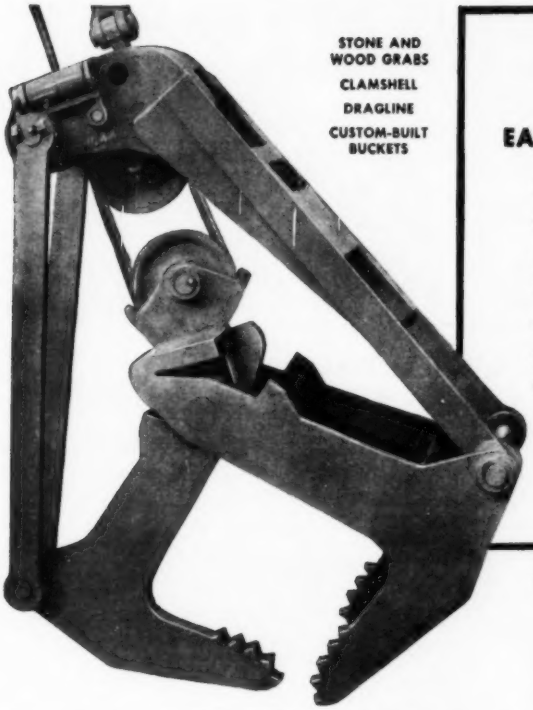
Established manufacturer of stationary and portable crushing equipment has several exclusive territories available for dealers in the United States and Canada. Write box No. 802, Pit and Quarry, 538 S. Clark Street, Chicago 5, Illinois, with description of territory covered, sales and service facilities and present accounts. All replies confidential.

DEPENDABLE FOR 50 YEARS

Woven Wire ALLOY SCREENS

TWIN CITY IRON & WIRE CO.

St. Paul, Minnesota



STONE AND WOOD GRABS
CLAMSHELL
DRAGLINE
CUSTOM-BUILT BUCKETS

WELLMAN

EASY HANDLING OF LARGE STONES

● Those big stones won't slip from the Wellman Stone Grab. Four-part closing cable reeving develops tremendous closing force on stones. Model shown has 5-ton capacity, 4½ foot jaw spread. Other capacities available.

Want Facts? *Send for free descriptive bulletins.*

THE WELLMAN ENGINEERING COMPANY
7014 Central Avenue
Cleveland 4, Ohio

Plurajet Cavity Blasting Units

A New Secondary Blasting Technique

Now Serving the Industry For Economical Reduction of Boulders

LABOR SAVING - - - - - TIME SAVING

HAS MANY SAFETY FACTORS—
MINIMUM OF FLYING ROCK FRAGMENTS

INCREASE YOUR PRODUCTION AT LESS COST IN LABOR AND EQUIPMENT

ELIMINATE COSTLY EQUIPMENT FOR SHOT DRILLING

EASILY HANDLED BY EXPERIENCED QUARRY MEN

FIVE SIZES OF UNITS AVAILABLE WITH BREAKING CAPACITIES UP TO 25 TONS

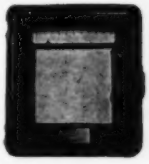
For additional information, sales prices, etc. Write or contact

SHAPED CHARGE EXPLOSIVE MANUFACTURERS, INC.
P. O. Box 900
Martinsburg, West Virginia
Telephone—Martinsburg 6838

REDUCE YOUR RATIO

OF FUEL - to - CEMENT

In these days of increasing fuel and labor costs, every economy you can make is important. Here is a sure way to SAVE FUEL. Cambridge Gas Analyzers will provide the Burner with a continuous and simultaneous record of the oxygen, carbon dioxide, and combustibles in the flue gas. O_2 analysis serves to warn against excessive air supply; combustibles analysis indicates oxygen demand under all conditions; CO_2 analysis reflects state of calcining process. Cambridge Instruments make uniform kiln operations possible with ease. Savings effected pay for installation in short time.



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CAMBRIDGE INSTRUMENT CO., INC.
3766 Grand Central Terminal,
New York 17, N. Y.

CAMBRIDGE GAS ANALYZERS

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

New Records in Gravel Reduction...RELIANCE Jaw Crusher

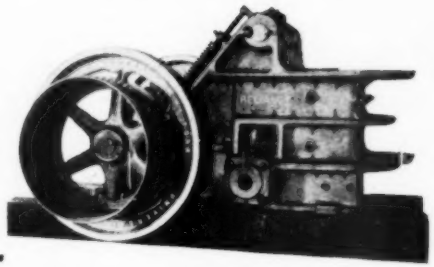
Chalk up top output and profit figures by single pass reduction of gravel with a RELIANCE Jaw Crusher.

RELIANCE Crushers are especially suited for this job—featuring rugged all-steel construction, low and large receiving openings, and long deep jaws for sure gripping and crushing. Jaws adjustable for fine or coarse product.

Fitted with Alemite high-pressure lubrication, smooth-running RELIANCE Jaw Crushers insure long, continuous service life and low-cost maintenance.

Write for Catalog No. 48, describing the RELIANCE complete line of sand and gravel washing and handling equipment.

UNIVERSAL ROAD MACHINERY CO., Kingston, N. Y.



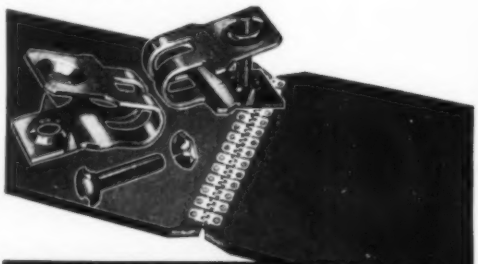
HINGED PLATEGRIP
BELT FASTENER No. 500

For Heavy Conveyor Belts of changing length

These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from $\frac{3}{8}$" to $\frac{1}{2}$" thickness. They offer special advantages in mines, quarries or industrial setups where length of position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

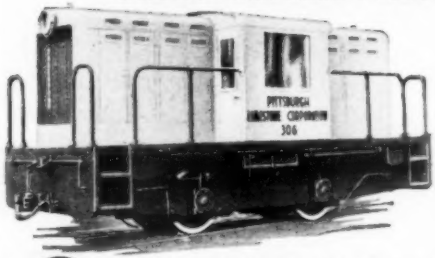
Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

Write for Circular.



ARMSTRONG-BRAY & CO.
5394 NORTHWEST HIGHWAY CHICAGO 30

LOWER HAULAGE COSTS MEAN LARGER PROFITS



This 35-Ton, 36" Gauge Davenport Diesel Electric Locomotive is in the Service of Pittsburgh Limestone Corporation.

DAVENPORT LOCOMOTIVES

Available in
STEAM
FIRELESS
GASOLINE
DIESEL
with
ELECTRIC
or HYDRAULIC
or MECHANICAL
DRIVE

PORTER Davenport Built LOCOMOTIVES

Whatever your particular rail haulage problem and operating conditions, we can build a Davenport Locomotive to FIT your individual needs — a sure way to insure lowest ton-mile haulage costs.

Our engineers will be glad to receive a description of YOUR haulage conditions and submit reliable, money-saving recommendations. No obligation.

Complete Information on Request

DAVENPORT LOCOMOTIVE Division
DAVENPORT BESLER CORPORATION
DAVENPORT IOWA, U.S.A.

EXPORT OFFICE • 50 CHURCH STREET NEW YORK 7 • CABLE ADDRESS DROSITES

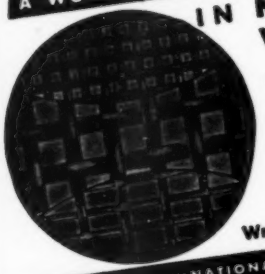
KING EXPLOSIVES

DETONITE !
THE QUARRY EXPLOSIVE

THE KING POWDER COMPANY, INC.
CINCINNATI 1, OHIO
Incorporated 1879

COMPLETE EXPLOSIVE REQUIREMENTS

Industry has
A WORLD OF CONFIDENCE
IN NAT-ALOY WIRE CLOTH



COVERS EVERY REQUIREMENT

. . . for a dependable, long-wearing, non-crystalizing Screen Cloth. Use "Nat-Aloy" Lock Crimp Meshes. Preferred for screening accuracy, economy and serviceability. All Sizes — All Meshes — All Gauges.

Write for Catalog No. 55

NATIONAL WIRE CLOTH CO., INC.
St. Paul, Minn.

Here is the ANSWER to your MAGNETIC SEPARATOR JOBS!

HOMER "POWER-PLUS" MAGNETIC SEPARATORS

PERMANENT non-electric—*Unaffected by HEAT, COLD or MOISTURE*

CAN BE USED INSIDE OR OUTSIDE PLANT

HOMER PULLEY

HOMER MAGNETIC PULLEYS AND PULLEY UNITS— Available in standard diameters from 12" to 30"; belt widths 4" to 60". Special sizes upon order.

HOMER MAGNETIC DRUMS— Available in standard diameters from 12" to 30"; face widths 4" to 60". Can be furnished with or without enclosure.

HOMER MAGNETIC PLATES— Available in standard widths from 4" to 26"; lengths and number of poles as required. Special fabrications to your specifications.

HOMER DRUM

Write for descriptive bulletins

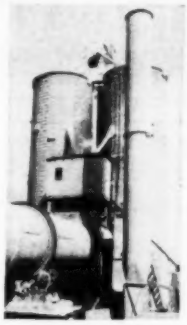
THE HOMER MANUFACTURING CO. INC., DEPT. I-52, LIMA, OHIO

Neff & Fry Silos

Carry Enormous Loads

• Shown in the accompanying photo are two 16' x 60' Neff & Fry Silos. Each holds 631 tons of crushed limestone. Conveying machinery is mounted directly upon the silos. An adjacent 16' x 47'6" silo, not shown in photo, holds 239 tons of coal and supports conveying machinery.

This installation exemplifies the distinctive strength which Neff & Fry Silos derive from their Super-Concrete Staves. The staves are formed under hydraulic pressure of approximately 140 tons, giving them rocklike density and load-bearing ability.



Neff & Fry Silos are being used for handling and storing 85 kinds of flowable bulk materials. Many of them have been in continuous service for more than 30 years with insignificant upkeep cost. They do not spall, rust, rot, or collapse.

Ask for our interesting folder, "Bins with the Strength of Pillars." It will be mailed to you.

THE NEFF & FRY CO. • 278 Elm St. Camden, Ohio

SUPER-CONCRETE STAVE STORAGE-BINS ◀ NEFF & FRY

25,000+ Cu. Yds. in 265 Hours

H & B 8" Pump Averages Nearly 100 Cu. Yds. per Hour!

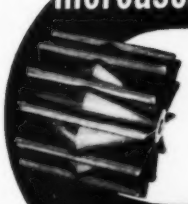
25,000+ cu. yds. in 265 working hours! That's the record of the Gunyon Dredging Co., Elkhorn, Wis., on a job at Lorain, Ohio. This was the total time, including the pipe line work on a discharge line 700 to 1200 lineal feet. The dredging was done with a Hetherington & Berner 8" Dreadnaught type pump. There's an H & B dreadnaught or standard type pump for every dredging job. Write for Bulletin DP-147.

H & B ESTABLISHED 1867

HETHERINGTON & BERNER INC.

715 Kentucky Avenue — Indianapolis 7, Indiana

Increases belt life up to 400%*



Belt Saver PULLEY

Available in Diameter sizes ranging from 6" to 40"

Write for Bulletin 35-A

126 to Sprout, Waldron & Co., Inc., 6 Waldron St., Muncy, Pa.

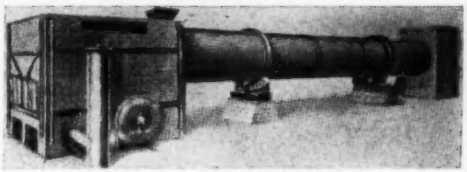
Sprout, Waldron

Manufacturing Engineers

MUNCY PENNSYLVANIA

* Based on users' reports

DRYERS & KILNS . . *for all purposes*



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ENGINEER & MANUFACTURER

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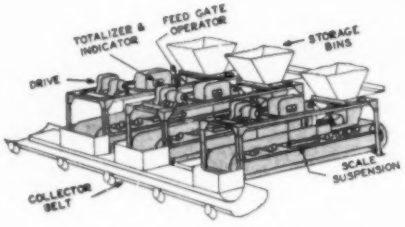

RAW MIX PROPORTIONING

TRANSPORTOFEEDERS

are actual automatic, continuous weighing and integrating scales.

TRANSPORTOFEEDERS

automatically and continuously transport, weigh, indicate instantaneous tonnage rate; integrate, totalize tonnage, and maintain a preset rate of feed.

SINTERING MACHINERY CORP.
TRANSPORTOMETER DIVISION
70 Pine Street **New York 5, N. Y.**

Here's your new "BUCKET SAVER" booklet

The ONLY book available that tells . . .

- **HOW TO SAVE YOUR BUCKET**
  Among the many "bucket saver" suggestions are a list of "do's" and "don'ts" on the use and abuse of clamshell buckets; tips on how to prolong cable life; common operating mistakes that make bucket lips bow in or bend out.
- **HOW TO GET MORE OUT OF YOUR BUCKET**
  "How to Reeve the Bucket for Maximum Efficiency" is illustrated and described in detail. One page is devoted to instructions for operators.
- **HOW TO REPAIR BUCKETS**
  Methods of renewing the cutting edges of worn bucket lips include special welding precautions. This section contains instructions for removing and replacing ball bearings in lever arm sheaves, lubrication instructions, and many other practical hints for care and maintenance.

SEND FOR BULLETIN 2373 TODAY!

BLAW-KNOX DIVISION
of Blaw-Knox Company
2004 Farmers Bank Bldg. • Pittsburgh 22, Pa.

BLAW-KNOX CLAMSHELL BUCKETS
THE MOST COMPLETE RANGE OF SIZES AND TYPES

TISCO MANGANESE STEEL WEARING PARTS

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TIMANG WELDING PRODUCTS

Since TW 1742

TAYLOR-WHARTON IRON and STEEL COMPANY

High Bridge, New Jersey

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OVER 15,000 POTENTIAL BUYERS
AT YOUR FINGERTIPS

PROFITABLE P and Q ADVERTISING

LIST YOUR USED EQUIPMENT OFFERINGS REGULARLY

in the

** BROADCAST SECTION*

of

PIT AND QUARRY

538 South Clark St. Chicago 5, Illinois

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The meeting place for buyers and sellers

*Largest Classified Advertising Section Serving the Industry

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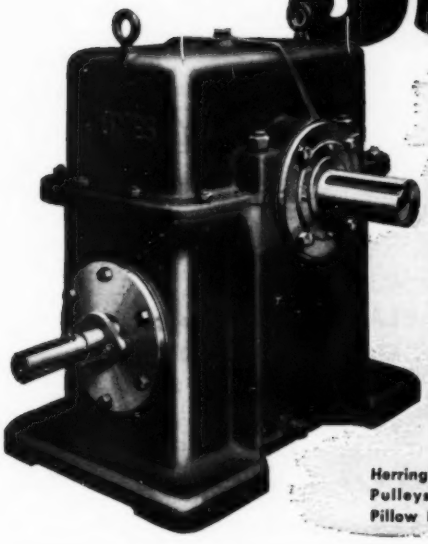


WORM GEAR SPEED REDUCERS

A right angle unit built for heavy duty performance in any industry. The worm can be above or below the gear. Shafts are single or double extended for coupling connections or chain or gear drives.

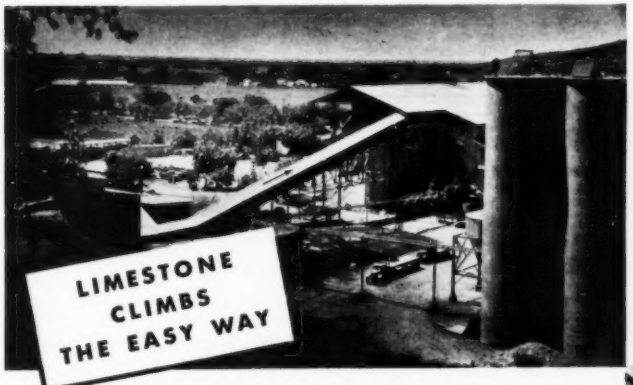
They are built in ratios from 4 to 1 to 90 to 1 and in capacities from ¼ to 100 H.P.

Bulletin No. 68 covers selection tables and dimensions.

W. A. JONES FOUNDRY & MACHINE CO.
4441 W. Roosevelt Rd., Chicago 24, Ill.

Since 1890
Jones
In the Service of Industry

Herringbone — Worm — Spur — Gear Speed Reducers
Pulleys · Gears · V-Belt Sheaves · Anti-Friction
Pillow Blocks · Friction Clutches · Flexible Couplings



LIMESTONE CLIMBS THE EASY WAY

This S-A Belt Conveyor moves 300 tons of crushed limestone per hour for a cement plant that produces up to 7,500 barrels per day —a healthy tonnage! The rock is conveyed from crusher house at ground level to the top of the material storage building. A new *low-cost per ton* has been achieved for this operation. S-A engineers drew on more than 50 years experience in designing this installation—experience with all types of bulk materials handling equipment. *To aid your planning, write today for full information.*

PONCE CEMENT CORP.
Ponce, Puerto Rico

Crushed rock, conveyed by 400-foot belt to top of storage building is discharged by S-A Traveling Tripper at any point over the 150-foot horizontal run above the storage bins. S-A bucket elevators are used elsewhere in the plant for handling cement. Photo below shows the inclined belt conveyor.

1901-1951
50 years experience with bulk handling
STEPHEN S-A ADAMSON MFG. CO.
20 Ridgeway Avenue, Aurora, Illinois · Los Angeles, Calif. • Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

BROADCAST P and Q SECTION

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Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

E. Lee Heidenreich, Jr.
Consulting Engineer
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Phone 1828

Operation
Plant Layout
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PARTNER WANTED FOR STONE QUARRY

Over 40 acres — Located in Indiana. Producing beautiful building stone, all shades of colors, stripes, etc. Drilled to 50', bottom not yet reached. Adjacent to excellent hard road.
Ideal market—Serving large cities. Must be seen to appreciate.

Box No. 902, c/o Pit and Quarry
538 S. Clark St. Chicago 5, Ill.

Diamond Core Drilling
CONTRACTORS

Fireclays, coal, limestone, gravel deposits, all minerals. Blast hole drilling.

MOTT CORE DRILLING CO.
Huntington, West Virginia

CORE DRILLING
ANYWHERE
We look into the earth
PENNSYLVANIA
DRILLING COMPANY
PITTSBURGH 20, PA.

WANTED
GENERAL PLANT MAINTENANCE AND REPAIR FOREMAN

Applicant must have past experience in position of at least equal responsibilities. All replies will be held in confidence. Salary will be commensurate with the applicant's experience. All of our employees know of this advertisement.

BOX NO. 811 — c/o Pit and Quarry Publications
538 South Clark Street Chicago 5, Illinois

POSITION WANTED

Graduate Mining Engineer. Six years experience in cement plant erection and production work for leading cement equipment manufacturer. Desires position as Asst. Plant Mgr. or Supt. Prefer Western location. Details upon request.

Box No. 804, c/o Pit and Quarry
538 S. Clark Street Chicago 5, Illinois

WANTED

2 Dredge Operators

Need Two Qualified, capable, experienced operators for 10 inch Sand & Gravel Dredge located in South Carolina at permanent installation with excellent rate of pay. Address reply, giving full particulars to:

Becker County Sand & Gravel Company
P. O. Box 471
Choraw, South Carolina

POSITION VACANT

A young Assistant Plant Manager needed to aid a busy Manager in the operations of a Cement Plant located in a large city. This plant is owned by a multi-plant organization with a splendid future to capable young men. Submit full details concerning age, experience and qualifications to **BOX NO. 504, c/o PIT and QUARRY,** 538 S. Clark Street, Chicago 5, Illinois.
(Our organization knows of this ad)

WANTED

One traveling chain type cutter for use on 6" sand dredge. Deposit 25' deep. Advise price, location and condition.

Box No. 803, c/o Pit & Quarry Publications
538 South Clark Street Chicago 5, Illinois

SUPERINTENDENT FOR CRUSHING PLANT

Experienced, capable man to operate a large slag crushing plant, capacity 3,000 tons daily. Prefer man with at least ten years experience to be in full charge. Salary commensurate with ability and results in operating this plant which is a new installation. In reply, please give complete history as to age, health, education, background and experience.

Box No. 814, c/o Pit and Quarry Publications
538 South Clark St. Chicago 5, Ill.

AVAILABLE

Manager-Superintendent — 25 years Experience Open Pit, Tunnel & Dredge Mining of Non Metallic Minerals.
Washing, Crushing, Filtering, Drying & Fine Grinding Limestone, Sand & Gravel, Cement, Feldspars, Phosphate & Clays.
Operation, Maintenance & Sales.
Salary $6500 or percentage Basis.

Address Box 816 c/o Pit & Quarry
538 S. Clark St. Chicago 5, Ill.

Portable Gravel Plant and Operator. Wish to contact owner and operator of portable gravel plant interested in leasing same on good contract Cleveland area. — Write:

LESLIE MILLER SUPPLY, INC.
Box 7 Bedford, Ohio

WE BUY & SELL

All types of New & Used machinery and equipment. See our ad. in this issue.

WEBBER EQUIPMENT CORP'N
10 East 44th Street, New York 17
MU 2-2747

DRAFTSMEN WANTED

For structural steel and concrete detailing, machinery layouts, etc., by large cement manufacturer near Omaha, Nebraska. Air-conditioned office. Write, telling experience and salary expected, to:

ASH GROVE LIME & PORTLAND CEMENT COMPANY
Louisville, Nebraska

POSITION WANTED

Superintendent & Manager of Sand, Gravel & Ready-Mix plants for past 15 years. Desires to make change. Would consider a partial purchase. Details upon request.

BOX NO. 807, c/o PIT AND QUARRY
538 S. Clark Street Chicago 5, Illinois

WANTED

Hopper Cars — Standard G
20 to 50 tons — Write to:

Box No. 704, c/o Pit and Quarry Publications
538 So. Clark Street, Chicago 5, Illinois

WANTED

1—RAYMOND 3-ROLL HIGH SIDE MILL WITH SEPARATOR, FAN, COLLECTOR, PIPING, ETC. WITH OR WITHOUT MOTOR.

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538 S. Clark Street Chicago 5, Illinois

L.B.SMITH INC. OFFERS

AIR COMPRESSORS

Ingersoll-Rand 105 cubic foot on 2 pneumatics. Good condition.

Schramm 105 cu. ft. gas powered compressor on 4 steel wheels.

Gardner-Denver two-stage 160 ft., skid mounted.

Worthington 210 cubic foot, two-stage air-cooled, on skid base with Hercules diesel.

Pennsylvania 12" x 10" class 3A single cylinder, 355 cubic foot P.D., flat belt driven, 50 HP slip ring motor.

Worthington two-stage, water cooled, vertical 250 ☆, 60 CFM, new condition.

BELT CONVEYORS & BELT
New 18" — 24" — 30" — 36"

SHOVELS & CRANES

Lorain 50, 1-yard diesel. New.

Lorain 55 clam-crane, 50' boom.

Brownhoist 1-yd. gas shovel and crane.

Lorain 30 combination ½-yd. shovel, hoe & clam.

Universal truck crane.

WELL DRILLS & TOOLS

Sanderson-Cyclone ☆42 well drill, new.

Sanderson-Cyclone ☆44 well drill, new.

Sanderson-Cyclone ☆40 well drill with drilling tools, excellent condition. Mtd. on K-5 International chassis.

GENERATORS & LIGHT PLANTS

1½ KW to 125 KW, alternating and direct current, gasoline and diesel powered.

QUARRY EQUIPMENT & BINS

3033 Cedarapids hammermill, rebuilt.
10 x 7 Allis Chalmers Blake type jaw crusher.
Cedarapids No. 1 Kubit
60 ton 2 compartment storage bin with clam shell gates.

MISCELLANEOUS

Barber-Greene 44C Trenching Machine.
Warco D7S grader. International UD14A diesel
Austin Western 77 tandem drive grader, 12' blade, scarifier.
½-yd. to 2-yd. clamshell buckets.
½-yd. to 5-yd. dragline buckets.
6-yd. and 12-yd. Sauerman buckets.

TRUCKS — TRAILERS

1½-ton Ford & Chevrolet.
2½-ton GMC. New and rebuilt.
2,000 gallon tanks on semi-trailer mounting.
New and rebuilt dump bodies.

GASOLINE AND DIESEL ENGINES

New and used Murphy 4-cylinder diesel.
GMC 6 and 12 cylinder. Practically new.
Buda, Hercules, Hill, rebuilt.

Phone HARRISBURG, PA. 7-3431

LASTING • BONAFIDE • SERVICE — L.B. SMITH, INC.

L.B.SMITH INC. CAMP HILL, PA. SUBURB OF HARRISBURG

WE OWN THE EQUIPMENT WE ADVERTISE

FOR - SALE

CEDAR RAPIDS PORTABLE CRUSHING plant with diesel generator sets. This plant will produce 125 tons per hour. The plant has a Model 80-D NORTHWEST shovel & dragline, and a Model 25 NORTHWEST shovel & dragline. This equipment is in excellent condition.

Box No. 817 c/o Pit & Quarry
538 So. Clark Street
Chicago 5, Illinois

FOR SALE

TWO (2) "Fairbanks-Morse" Used Diesel driven Generating Plants, consisting of:

FM type VA Diesel engines
257 RPM - 180 HP

with 150 KVA - 257 RPM, 3 Ph. 60 cycle, 480 volt Alternators and FM - 7½ AMP, 257 RPM Excitors. GOOD CONDITION - READY FOR WORK.

ARROW CONTRACTORS EQUIPMENT CO.
2020 Walnut Street
Chicago 12, Illinois
SEeley 3-2040

BETTER BUY NOW!

TRACTORS

International "TD-14" Used Diesel Tractor w/B-E Dozer
International "TD-40" Used Diesel Crawler Tractor
Caterpillar D-8 2-U Series, 3500 hours. Caterpillar dozer, DD 14CU
Minneapolis-Moline "BTI" Industrial Tractor w/Lull Shoveloader—New
LaPlant-Choate "C-44" New 4-yd. Scraper. Save $1,000.00
Reuke "70" Maintainer, 10' blade, hydraulic @ $1,985.00

CRUSHING EQUIPMENT

Cedarapids Portable Gravel Plant; Jaw, Rolls, Screen
Diamond 21 yd. straight leg Bin. New.
Conveyor Belting 140' 24" 4-ply. New. Top grade
Conveyor Belting 95' 18" 4-ply. New. Top grade

CRANES AND SHOVELS

Northwest "25" ¾ yd. Diesel Dragline, 40' boom
Quick-Way "F" New ¼ yd. Hoe or Dragline mounted on White half-track
Erie ⅝ yd. New Clamshell Bucket
Wellman "12M" New ½ yd. Clamshell Bucket

MISCELLANEOUS

Schramm "105" Used Portable Compressor, Pneumatics. Sale/Rent
Davey "105" Portable Compressor, 2-Wheel, Pneumatics. Sale/Rent
Rex "68" Used 1-Bag Mixer
Jaeger "68" Used 1-bag Mixer
Rex "27-E" Used Paver, big drum. Ready to pave
Rex "34-E" Dual Drum New Paver. Mechanical Man Controls

EIGHMY EQUIPMENT COMPANY
Pierpont at W. State St., Rockford, Ill.

CLYDE HYDRATOR WITH KUNTZ CONTINUOUS DUSTLESS SYSTEM, 4-5 T.P.H.

#0 RAYMOND AUTO PULVERIZER WITH THROWOUT, SEPARATOR & CYCLONE.

HERCULES JR. 3 ROLL PULVERIZER

24 x 18 A JEFFREY HAMMER MILL
5' x 22" HARDINGE DRY BALL MILL
KUNTZ 5 x 20 CONTINUOUS HYDRATOR.

#2 CLYDE BATCH HYDRATOR.

GANTRY & O.E.T. CRANES

10 TON P & H—80' SPAN.
3—5 TON NILES SHEP, 32'8" SPAN.
45 TON CLYDE 85' BOOM, GANTRY.
50 TON AMER. 120' BOOM GANTRY.

DARIEN, 60 E. 42nd St., N. Y. 17, N. Y.

FOR SALE

1—Used 54 x 24 Roll Crusher, s/n 54-7-58602, conveyor 15' x 30", belt 33' x 30". 1—set "V" belts for D-17000, anti-friction bearings, drive roll corrugated — other roll smooth, less engine. A-1 CONDITION — READY TO GO $12,500.00

1—New Pioneer 3' x 8' three deck vibrating screen, s/n 38-2A-335, complete. Top deck 1" sq. openings, center deck ¾" sq. openings, bottom deck ½" sq. openings, bin mounting—motor mounting—Wisconsin VE-4 Gas Engine, s/n 964203, V belt drive—1200 R.P.M. $3,006.00

JOHN FABICK TRACTOR COMPANY
3100 Gravois Avenue **St. Louis 18, Mo.**

GOOD EQUIPMENT IMMEDIATELY AVAILABLE

BINS
16' x 20' straight side, 7' cone.
7'8" x 11'6" x 17'3" (2).
8' x 8' x 14' with 4' U bottom (2).
4' x 5' x 30' (2).

BUCKET ELEVATORS (Steel Encased)
11' centers, 4" x 6" buckets.
22' centers, 4" x 6" buckets (4).
30' centers, 4" x 6" buckets (4).
40' centers, 4" x 6" buckets.
48' Webster, 14" x 7" buckets.
68' Jeffrey, 10" x 6" buckets.

BUCKETS
L.B., MS, 6"x4", style A (150 NEW).
L.B., MS, 8"x5", style A (96).
L.B., MS, 8"x6"x5½".
L.B., MS, 18"x8"x8½", style ARB (190 NEW).

CHAIN
185' NEW Jeffrey H82, 3¼" pitch.
100' NEW Jeffrey 88-2-¾" pitch.
(Other types in stock)

BELT CONVEYORS (Troughing)
104 ft. centers 14" w/structural (2).
48 ft. 4 in. centers 14" w/structural.
24 ft. centers 14" w/structural.
13 ft. centers 14" w/structural.

FEEDERS & SCREENS
Syntron, vibra-flow, type F-350.
Jeffrey-Traylor, type 4JT 155.
Al. Chal., electro magnetic, "Utah."
Hummer, screen, 3' x 10'.
Syntron V200.

KILNS, COOLERS, DRYERS
3' x 25' x ⅜" shell, riveted (2).
4' x 16' x ⅜" shell, welded (1).
4' x 25' x 5/16" shell, welded (1).
4' x 34' x 5/16" shell, welded (1).
4'6" x 40' x ⅜" shell, welded (1).
5' x 14' x 9/16" shell, welded (2 NEW).

TANKS
6,500 gal., 76"x27'10" TANK CAR TANKS.
9,600 gal., 11'x13'9"x⅜" (NEW).
13,500 gal., 10'x21'6"x1".
15,300 gal., 9'x32'x5/16".
16,200 gal., 10'6"x25'x¼".

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AUTOCLAVES	PUMPS
BINS	REDUCERS
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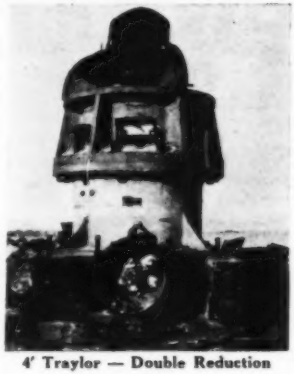

4' Traylor — Double Reduction

1—4' Traylor-Stearns Double Reduction Finishing Crusher. 3" intake, ½" output, 120 tph. New 1941. Was TY, converted to TS. Condition good. Price: $7500.00 without motor.

1—2' Symons Standard Cone Crusher with 30 H.P. Motor, oil tank and pump.

2—Size #5 Allis Chalmers Gyratory, Type K. 8" intake, 2" discharge. 50 H.P. motor required. Price on request.

1—8" x 12" Wheeling Jaw Crusher.

1—10 x 20 Pacific Type KH Jaw Crusher with 25 H.P. G.E. Motor, and starter.

—Also all types mining, milling machinery—

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Send for our latest complete bulletin

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Immediate Shipment

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1—New 5' x 12' Telsmith Vibro-King Vibrating Screen—double deck.

3—Allis-Chalmers 667 KVA transformers, outdoor type 18000 HV—2400 TV, 480 LV, late model.

1—24" Gauge Battery Locomotive with two 40-cell batteries including all charging equipment.

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160 ft. Gardner-Denver Air Compressor, gasoline, on 4 steel wheels.
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3 KVA Special Army Generator Sets
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A number of new manganese steel screen sections for Allis Chalmers 6' revolving screens 2¼" perforations.

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30", 24" & 18" widths.

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LOT NEW PARTS MANGANESE GRATES, HAMMERS, LINERS AND FRAME CASTINGS FOR WILLIAMS #5 JUMBO MILL.

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1—18 x 18 SUTORBILT BLOWER

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CINDER, PUMICE, PERLITE CRUSHERS

10 to 20 tons per hour capacity....$ 479.00
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Complete with hopper.

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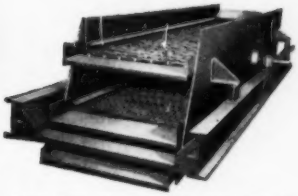

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Manufactured by American Hoist & Derrick Co. Electric engine, 75 Ft. Boom, 1,000 Ft. of steel cable, Otis Elevator Co. 35 H. P. Motor. Complete with all equipment.

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One Pug Mill or 12" dia. shaft paddle Mixer, 10'0" chain drive.
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24 x 36 FARRELL
14B JAW CRUSHER
$6500.00 NORTH CAROLINA
DARIEN CORPORATION
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NEW EQUIPMENT

1—#0 Automatic Pulverizer with 5'-6" Dbl. Whizzer Separator and Throwout, Including RF-22N-48 Exhauster, 12" x 24" Hydrate Feeder and 7'-0" Cyclone Collector. Made by Combustion Engineering Company, Inc., Raymond Pulverizer Division, Chicago, Illinois. Never taken out of crates.

1—F 33 Syntron Electric Vibratory Feeder complete with FC Controller and with 18" x 42" trough, 440 volt, 60 cycle. Suspension mounting. This is new equipment never out of crate.

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1—Ingersoll-Rand, Portable Air Compressor. 160 c.f.m., two stage air compressor, powered by Waukesha gasoline engine. Engine and compressor reconditioned, new radiator core and new magneto.

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1—6 x 8 inch Jaw Crusher, ball bearing.

1—Hammer Mill, ball bearing. Maximum opening for stone up to 8". Rated at 30 t.p.h. with power demand of 40 h.p.

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2—Truck dump beds with 7" hoists and power take-off. St. Paul 4 yard water level capacity, heavy duty.

1—Pair Saddle gasoline tanks for truck, 50 gallon capacity.

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Width	Ply	Top-Bottom	Covers
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20"	5	1/8"	1/32"
24"	4	1/8"	1/32"
24"	5	1/8"	1/32"
26"	5	1/8"	1/32"
30"	5	1/8"	1/16"
30"	6	1/8"	1/16"

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46—KOPPEL, 1½ Yd., 24 & 30 & 36 & 42 In. Ga., V Shaped.
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2'x3', 4'x3', 4'x4', 5'x4', 6'x4', 6'x6' & 7'x8' Cylindrical Ball Mills, Marcy, Allis Chalmers, etc.
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4 & 5 T.P.H. Continuous Dustless Hydrators.
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30", 8', 10', 14' & 16' Air Separators, Sturtevant & Gayco.
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10—IR—FMS—Wagon Drills

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Cam & Roller Type—8x10, 6x20, 10x16, 10x20, 10x36, 11x18, 13x18, 14x32, 13x34, 13x36, 11x34, 11x39, 13x34, 14x36, 15x36, 18x32, 9x40, 24x40, 32x50

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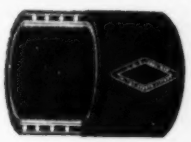

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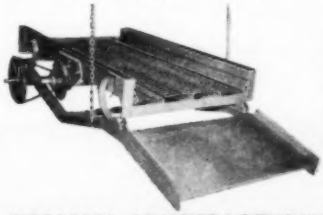

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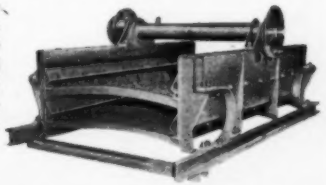

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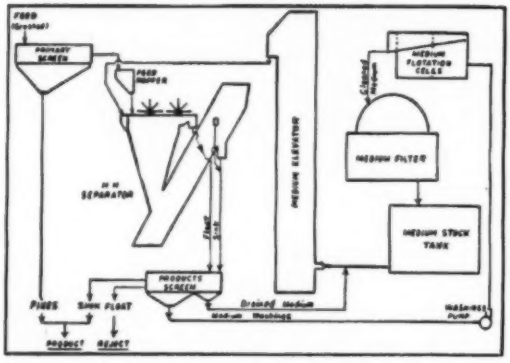

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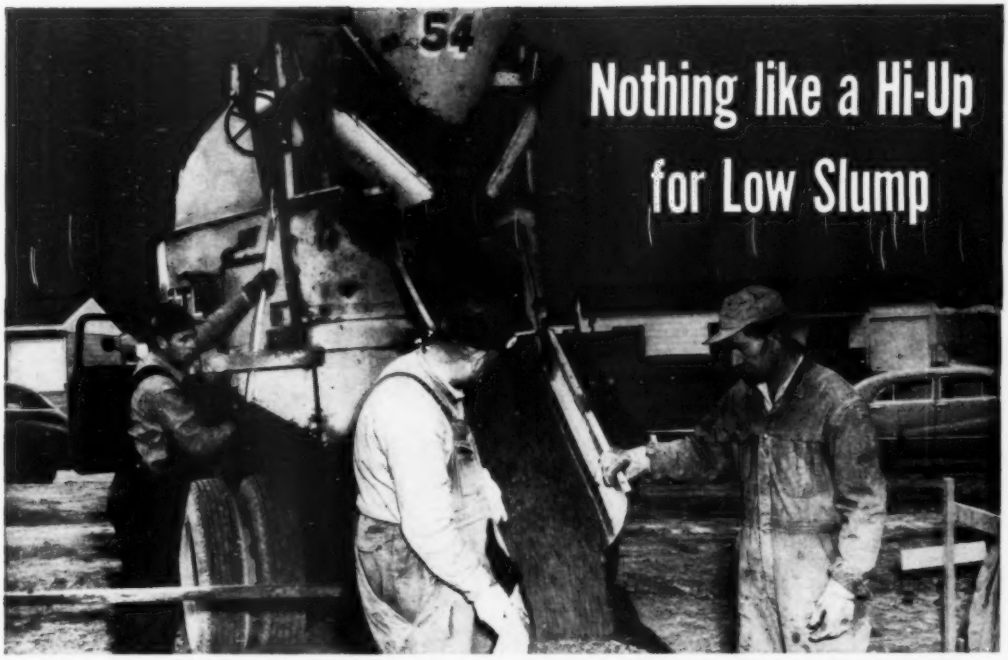

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Photo of 4½ cu yd Worthington-Ransome Blue Brute Hi-Up Truck Mixer fleet operated by Concrete Inc., Denver, Colorado.

Photo of 5½ cu yd Worthington-Ransome Blue Brute Hi-Up Truck Mixers operated by Lattanzio Transit Mix Co., Inc., Schenectady.

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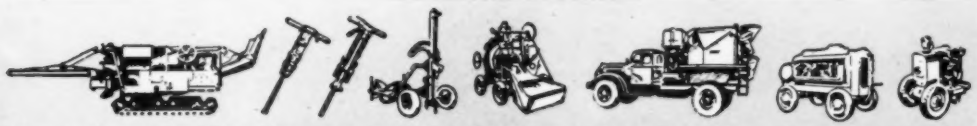

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